SolarEdge Home Hub Three Phase Inverter – Supported Use Cases for Storage-only and Backup installations

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Revision History

- Version 1.2 Added backup and storage modes, October 2023
- Version 1.1 Storage mode release, April 2023

Important Notice

Using a configuration in contradiction to the instructions in this document voids the warranty of any SolarEdge equipment.

Disclaimer

Introduction

The SolarEdge Home Hub Three Phase Inverter (SExK-RWB48), or “SolarEdge Home Hub Inverter” or “the Inverter”, can be used for various applications that enable energy independence for system owners by utilizing a battery to store and supply power as needed. The Inverter, when installed in combination with the “SolarEdge Home Backup Interface Three Phase” and connected to a compatible battery, provides backup power during a utility grid failure. The solution is based on the Inverter that manages both the PV system and the battery. This document describes the supported system configurations, compatible Inverters and battery models, and use cases.

For detailed information on connection between products and configuration of the relevant products, refer to the SolarEdge Knowledge Center and the appropriate product installation guides.

Compatible Batteries

Battery Manufacturer	Compatible Models	Supported Firmware Versions
SolarEdge Home Battery 48V	BAT-05K48M0B-01, BAT-0548M0B-02	Inverters - 4.17.136 and later Battery -1.126 and later

Refer to Technical Note - Compatibility Matrix for SolarEdge Home Three Phase Inverters and Batteries

Definition of Terms

- The term **DC coupling** refers to a case when the inverter is connected to PV and Battery.
- The term **AC coupling** refers to cases where multiple inverters are connected in parallel on their AC side, while the PV production of one inverter can charge a battery connected to another inverter. It also refers to a case when the battery is charged from the grid.
- The term **Storage-only installations** refers to systems using one or multiple inverters, at least one with a connected battery, but no Backup Interface.
- The term **Backup installations** refers to systems using one or multiple inverters from which at least one is a Home Hub Three-Phase Inverter with a connected battery. In addition, the Backup Interface Three Phase is installed to disconnect from the grid during backup operation.
- RS485 connections– the Inverter has two separate RS485 bus connections:
  RS485-2 – labeled on the Inverter as “RS485-2” - is ONLY used to connect between leader and follower inverters.

- RS485-1 or RS485 – the SolarEdge Home Hub Three Phase Inverter has an RS485 port as part of a 7-pin connector located at the bottom of the main circuit board. This port is used to connect the Backup Interface to the Inverter. In case a wired meter is connected in addition to the Backup Interface, the meter should be connected to the RS485 connector of the Backup Interface in addition to the cable connecting the Backup Interface to the Home Hub Inverter.

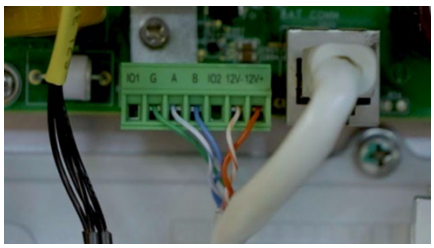

Figure 1 - Backup Interface and meter connections

NOTE

The communication board of the SolarEdge Home Hub Three Phase Inverter has an occupied connector labeled "RS485 1" which is used for internal connection. DO NOT remove this connection and DO NOT connect any cable to this connector.

Recommended Cables

	Cross-section	Wire type	Maximum Length
DC PV	6mm^2	1000V double isolation	Up to 300m
Battery DC	35mm^2	1000V double isolation, Outer Diameter 11-16.5mm	Up to 5m
CAN	>0.25mm^2	CAT 5e/6 or twisted pair 600V insulation	Up to 5m
RS485	>0.25mm^2	CAT 5e/6 or twisted pair 600V insulation	Up to 50m
AC cables	2.5-16mm^2	Multi core Outer Diameter: 15-21mm	According to local regulations

Communicating Between Multiple Inverters

Using multiple SolarEdge inverters at a site requires one of them to be configured as a Leader and the others as Followers.
To provide backup power, the Leader inverter must be a SolarEdge Home Hub Three Phase Inverter, connected to a battery (mandatory) and PV (optional).
The Leader inverter connects to the SolarEdge Monitoring via the Internet in one of the following ways:

- A home router using an Ethernet (LAN) cable (recommended communication option).
- Wirelessly via the built-in Wi-Fi interface. An external antenna is required (purchased separately from SolarEdge) The SolarEdge Wi-Fi Gateway can be used for simple and robust configuration and to expand the wireless range (purchased separately from SolarEdge).
- A plug-in LTE module (purchased separately from SolarEdge).

Follower inverters are connected to the SolarEdge Monitoring via the Leader inverter. To communicate with the Leader inverter, the Follower inverters connect to the Leader inverter via the SolarEdge Modbus protocol using the RS485-2 communication port.

Wired Communication Leader–Follower

Connect the Leader inverter and its Follower inverters through the same dedicated RS485 bus of the inverter. For the SolarEdge Home Hub Three Phase Inverter this port is RS485-2. It is important not to share this RS485 bus with any other RS485 device such as external meters, smart devices, or backup interfaces. Connect to other devices through a separate available RS485 bus.

When connecting multiple SolarEdge inverters in Storage mode, it is recommended that the Home Hub inverter is the Leader. If the inverters are intended to be used in backup power mode, the Home Hub inverter must be configured as the Leader inverter and it must be connected to the Backup Interface three phase. Figure 2 shows the wired communication between inverters in Leader-Follower mode.

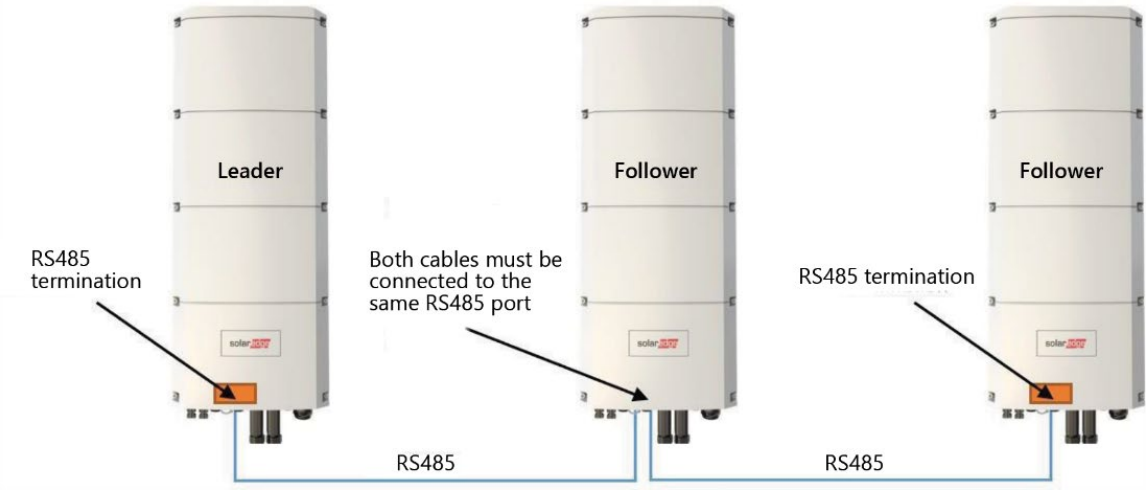

Figure 2 -Wired Communication Between Inverters

NOTE

The Leader inverter can also be positioned in the middle of the daisy chained RS485-2

RS485 is a serial bus type of connection, which means the wires must be connected in parallel from one inverter to the other. The middle inverters must have the two cables from the other inverters connected in parallel at the same RS485-2 port.
For detailed instructions on how to connect the Leader and Follower inverters, refer to the product installation guide of the inverter.

Using Meters

Backup installations

- Full Home Backup (FHB): The internal export/import meter of the SolarEdge Home Backup Interface Three Phase (BUI) must be used.
- Partial Home Backup (PHB): For Partial Home Backup, connect selected loads to the grid side (outside the backup island) of the backup interface (labeled "GRID"). A separate SolarEdge meter must be installed as an export/import meter at the grid connection point to control the system. This meter must communicate with the Leader inverter via SolarEdge Home Network ("Home Network") or via RS485 protocol. When connected through RS485, the meter must be connected to the RS485 port of the Backup Interface.
- Third-party inverters[1]: If third-party inverters are used in the system, connect all third-party inverters to the grid side (outside the backup island) of the backup interface (labeled "GRID"). A separate SolarEdge meter must be installed as an export/import meter at the grid connection point to control the system. To correctly display the production of third-party inverters in the monitoring platform, an "ext. production meter" must be installed. These meters must communicate with the Leader inverter via SolarEdge Home Network or via the RS485 port of the backup interface.
- Combination of Partial home backup and Third-party inverters is permitted using the guidelines defined above.

Storage-only installations

- A SolarEdge meter must be installed as an export/import meter at the grid connection point to control the system. This meter must communicate with the Leader inverter via SolarEdge Home Network ("Home Network") or via the dedicated RS485 port (a 7-pin connector, at the bottom of the inverter; used to connect the backup interface in Backup installations).
- If a third-party inverter is used, an additional SolarEdge meter can optionally be installed at the AC output of the third-party inverter as an "ext. production meter" to correctly display the production in the monitoring platform. This meter must communicate with the Leader inverter via the SolarEdge Home Network ("Home Network") or via RS485-1 port over the export/import meter.

Connecting Multiple Inverters to the Same AC Grid

- When installing multiple inverters, all inverters and the Backup Interface unit must have the same phase sequence and consistent phase mapping. Figure 2 shows the AC wire terminals of an inverter.

[1] Depending on the firmware version.

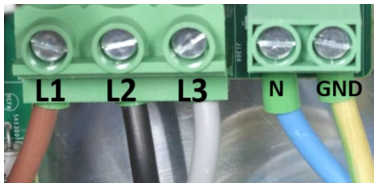

Figure 2: Inverter AC wire Terminals

Connection of the Manual Shutdown (MSD) Switch and "double-feed supply"

If backup operation is activated (default when BUI is connected to the inverter), the inverter starts supplying backup power a few seconds after a grid outage or after the main AC circuit breaker is turned off.

When the main AC circuit breaker is turned off for maintenance operations there is a safety risk since the inverter continues providing backup power to the main load panel. To prevent the inverter from providing backup power during maintenance operations, the inverter must also be turned off, either through the MSD switch or through the switching the 1/0/P switch to "0" position.

To provide a quick and reliable shutdown of the backup inverter, SolarEdge recommends connecting an Manual Shutdown switch which shuts down the inverter and activates SafeDC™. For detailed information on the MSD switch refer to Application Note - Connecting External Shutdown Switch to SolarEdge Home Hub Inverter - Three Phase

Prerequisites for Backup Operation

- The Leader inverter must be a Home Hub Three Phase Inverter and must be connected to the Backup Interface Three Phase via RS485 for communication.
- The Leader Home Hub Three Phase Inverter must be connected to a compatible battery.
- It is recommended to connect the Leader inverter to a PV string.

Backup Installations – Inverter Compatibility Matrix

The following table provides a compatibility matrix for combinations of inverters, batteries, and backup options. Note that some of the configurations described in this table require specific firmware version support. For availability and more details, consult your sales representative.
Using a configuration in contradiction to the instructions in the document is not supported and is a warranty exclusion case.
Follower inverters in multi-inverter configurations are limited to SolarEdge inverters with SetApp only (CPU Version 4.19.xx and up).

NOTE

This table is also relevant to:

- Partial home backup installations
- Three phase Home Hub Inverter in Storage-only installations

The "Current Release" mentioned in the table below refers to a minimum CPU Version 4.19.

Configuration	Leader	No. of Follower Inverters	Follower Inverter types	Compatibility and Maximum AC Power in Backup Mode	Reference
Single Inverter	SolarEdge Home Hub Three Phase Inverter - (SExxK-RWB48)	NA	NA	* Battery only: up to 5kW * PV + battery: up to inverter nameplate	Basic Configuration – Single Inverter
Multiple SolarEdge Inverters	SolarEdge Home Hub Three Phase Inverter - (SExxK-RWB48)	Up to two inverters from the supported types	SolarEdge Home Hub Three Phase Inverter (SExxK-RWB48)	Current release: Only the Leader produces during backup, same power as for the single inverter configuration. Future release[2]: in addition to the leader, each SExxK-RWB48 inverter produces: * Battery only: up to 5kW * PV + battery: up to inverter nameplate	Backup installation with Multiple Inverters, PV Strings, and Batteries
			StorEdge Three Phase Inverter (SExxK-RWS)	Current release: Only the Leader produces during backup, same as for the single inverter. Future release: in addition to the leader, each SExxK-RWS, (with manufacturing date after WW22 in 2022), produces: * Battery only: up to 5kW * PV + battery: up to inverter nameplate	Installation of SolarEdge Home Hub Three Phase Inverter with a StorEdge Three Phase Inverter
			SolarEdge Home Wave Inverter - Three Phase (SE3K to SE10K)	Only the Leader produces during backup, same as for the single inverter.	Backup installation with Multiple Inverters, PV Strings, and Batteries
			SolarEdge Home Wave Inverter - Three Phase (SE12.5K) and SolarEdge Three Phase Inverter (SE15K, SE16K, and SE17K)	Only the Leader produces during backup, same power as for the single inverter configuration In order to install SE15K, SE16K, and SE17K, they must be installed with a "residential FW version". Contact SolarEdge for details before installation	Backup installation with Multiple Inverters, PV Strings, and Batteries

[2] For the exact supported date, contact a SolarEdge sales representative.

Configuration	Leader	No. of Follower Inverters	Follower Inverter types	Compatibility and Maximum AC Power in Backup Mode	Reference
			SolarEdge Home Wave Inverter - Single Phase (SExxxxH-RW0*) and StorEdge Single Phase (SExxxxH-RWS*)	Current release: not supported during Ongrid and offgrid. Future release: Only the Leader produces during backup, Power is the same as for the single inverter.	Installation of SolarEdge Home Hub Three Phase Inverter with a StorEdge Single Phase Inverter
Third Party Inverters	SolarEdge Home Hub Three Phase Inverter - (SExxxK-RWB48)	Any number of 3rd party inverters (can be installed with any of the SolarEdge inverter models listed above)	Third-party inverters connected on the "LOAD" side of the BUI.	Future release: Only the Leader produces during backup, as for the single inverter.	Backup installation with third party inverters, PV Strings, and Batteries
			Third-party inverters connected on the "GRID" side of the BUI.	Only the Leader produces during backup, same as a single inverter	Backup installation for Partial Home Backup

SolarEdge Home Hub Single Phase (SExxxxH-RWB*) is not supported as Follower inverter in Storage-only and Backup Installations

System Diagrams

General System Configuration with Multiple Inverters, Storage and Backup

Figure 3 shows a high-level system diagram that includes backup and storage. The backup interface communicates with the Home Hub Inverter (leader) via an RS485 bus. For detailed information of the BUI and Inverter's installation refer to the BUI and the Inverter installation manuals. The follower inverters in this diagram can be any of the inverters defined in the table above with their respective supported batteries.

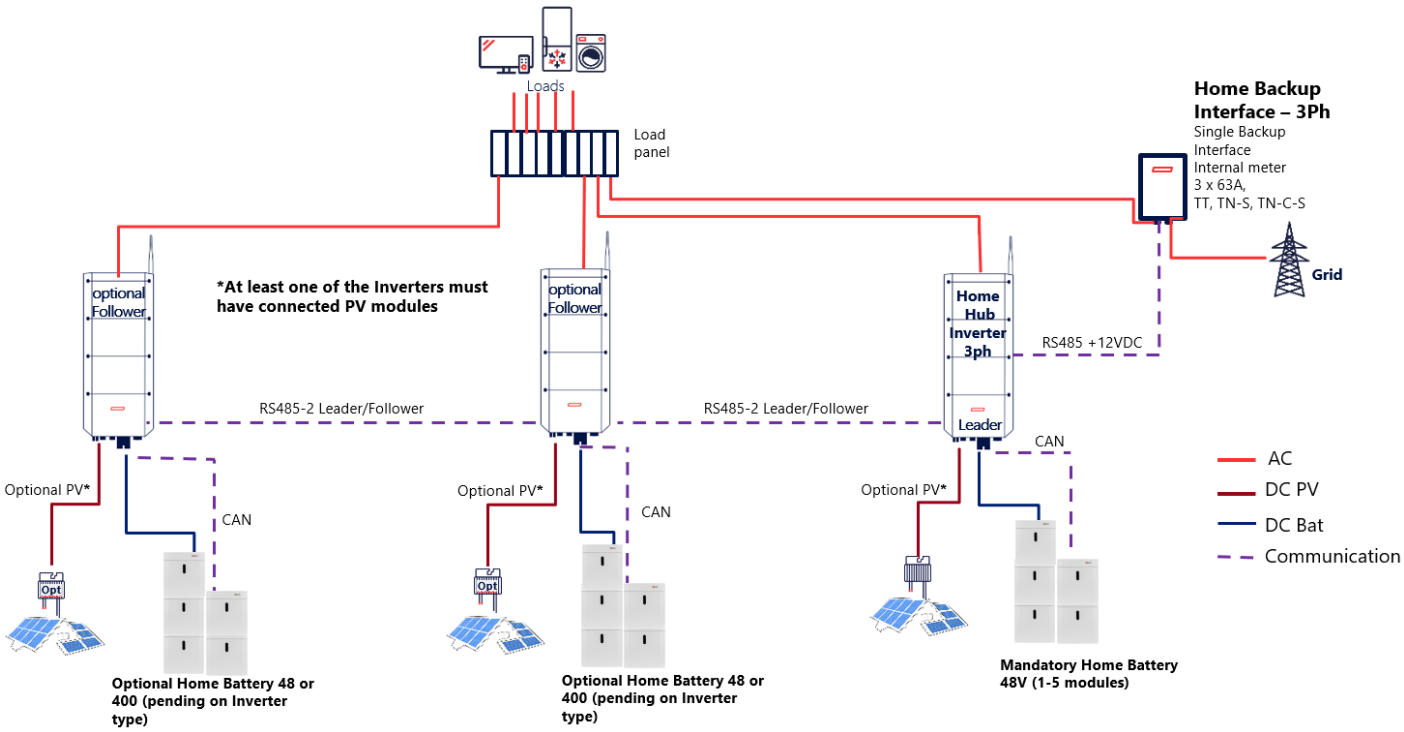

Figure 3 Backup Power and Storage System Diagram

Basic Configuration – Single Inverter

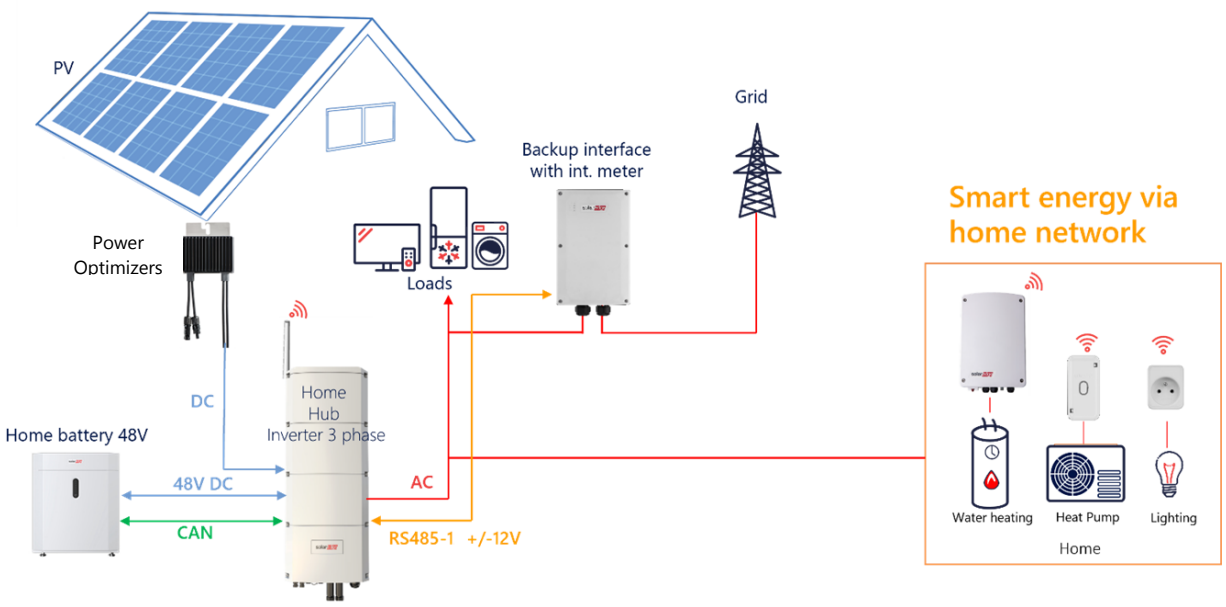

Figure 4 - Backup installation - single inverter

Backup installation with Multiple Inverters, PV Strings, and Batteries

The drawing below shows the Follower Inverters being SExxK – RWB48, but they can also be one or two of the following models as defined in Backup Installations – Inverter Compatibility Matrix

- SExxK-RWS
- SE3K-SE10K
- SE12.5-SE17K[3]
- SExxxxH-RW0, SExxxxH-RWS – future release
- Third party Inverters

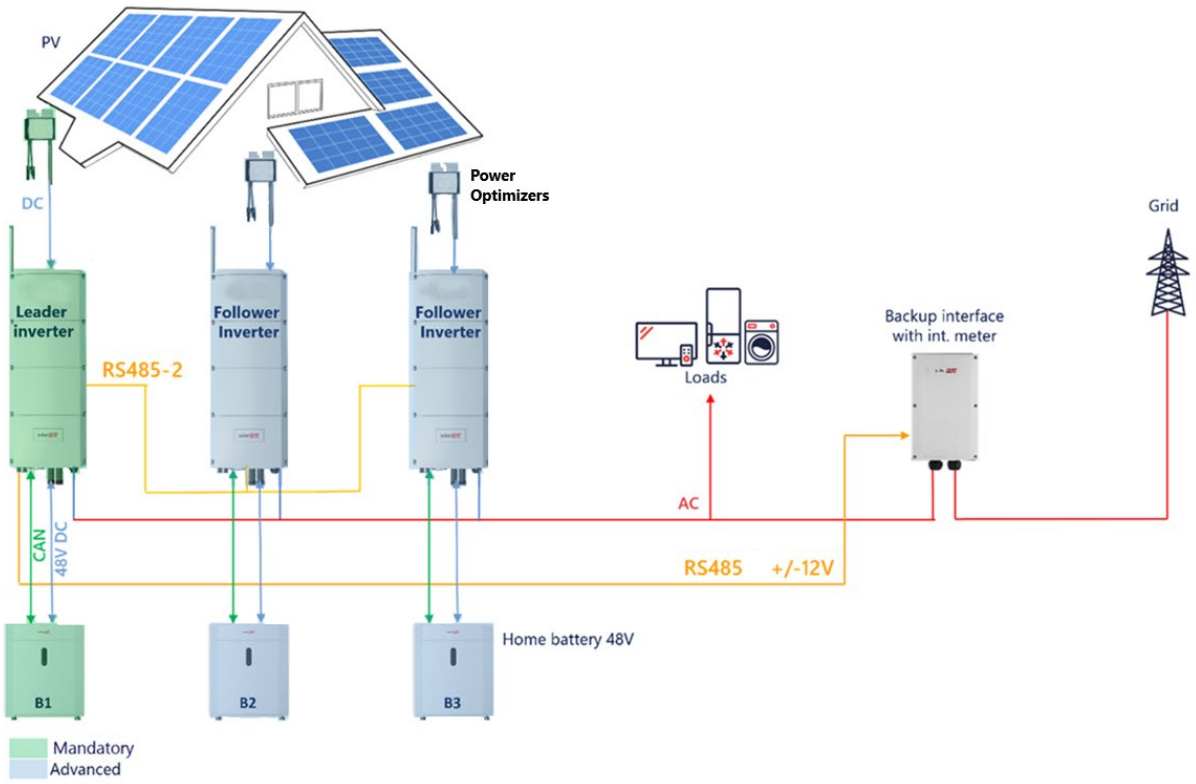

Figure 5 Backup Installation with Multiple Inverters, PV Strings, and Batteries

[3] Pending "residential FW version" installed. Please contact SolarEdge support for more details

Backup Installation with Third-party Inverters (on the "GRID" side), PV Strings, and Batteries

The drawing below shows the third party inverters or non-supported SolarEdge Follower inverters being installed on the "GRID" side (outside the Island grid). With the current release, this is valid for the following inverters

- SolarEdge SExxxxH-RWB
- Third party Inverters

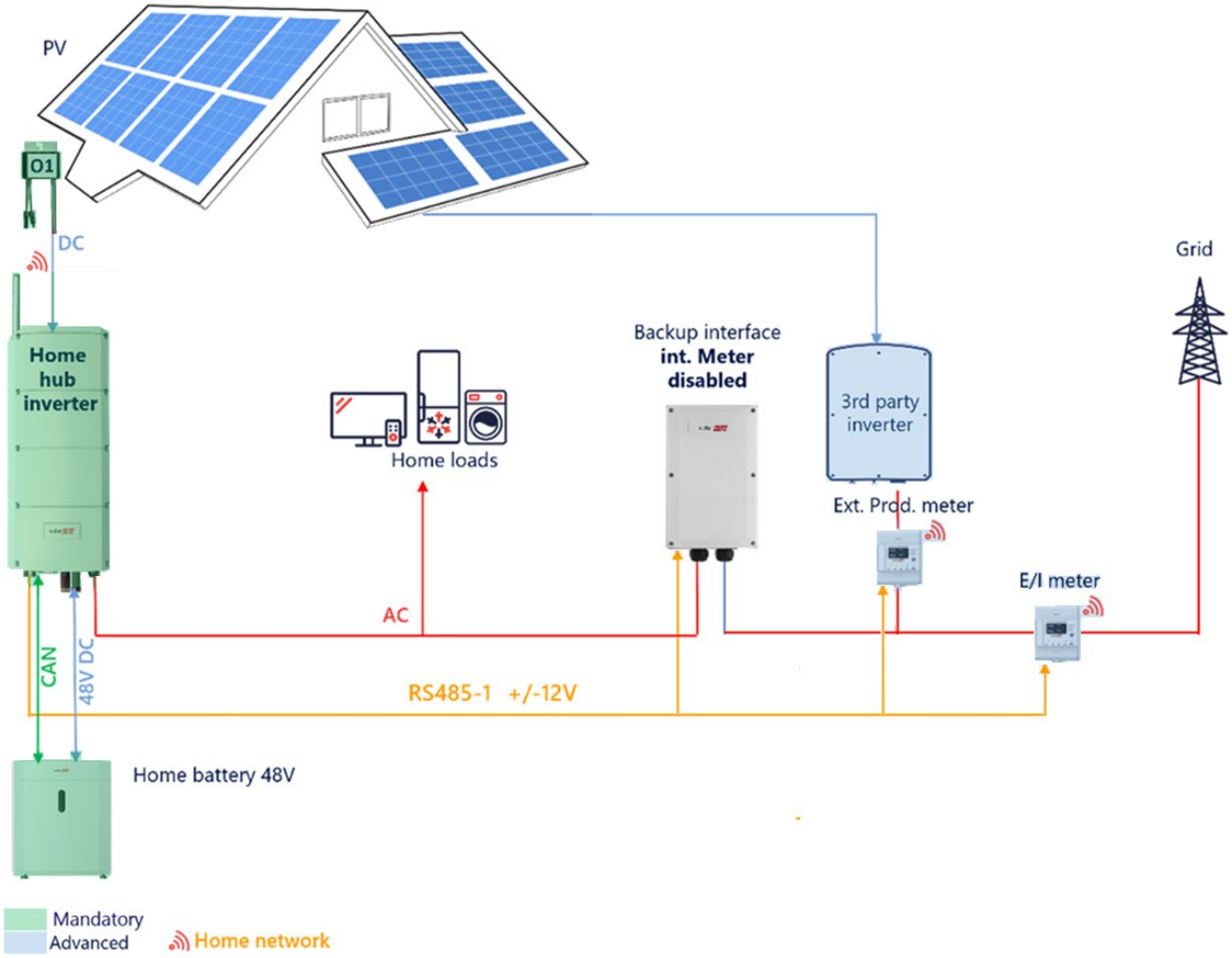

Figure 6 Backup installation with Third-party Inverters or specific SolarEdge Inverters (on the BUI's "GRID" side), PV and Batteries

Backup installation for Partial Home Backup

NOTE

- In a partial backup solution or systems with third-party inverters (on the grid side), the integrated import/export meter in the backup interface cannot be used. Instead, an external import/export meter must be installed at the grid connection point. For this option it is necessary to disable the integrated meter and enable the external meter. For detailed setup instructions how to disable the BUI integrated meter, refer to the commissioning section in the installation manuals of the relevant meters and backup interface.

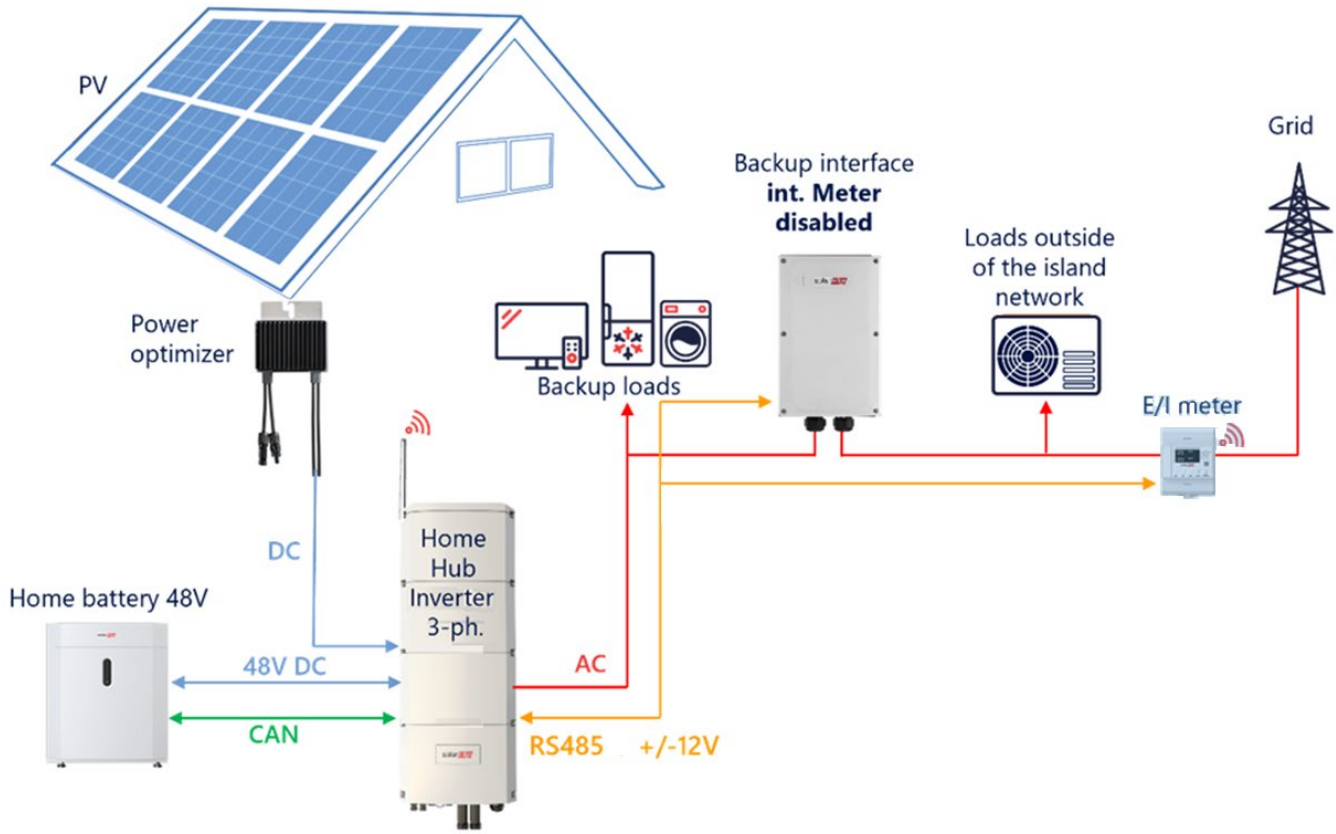

Figure 7 - Backup Installation for Partial Backup

More Examples

Installation of SolarEdge Home Hub Three Phase Inverter with a StorEdge Single Phase Inverter

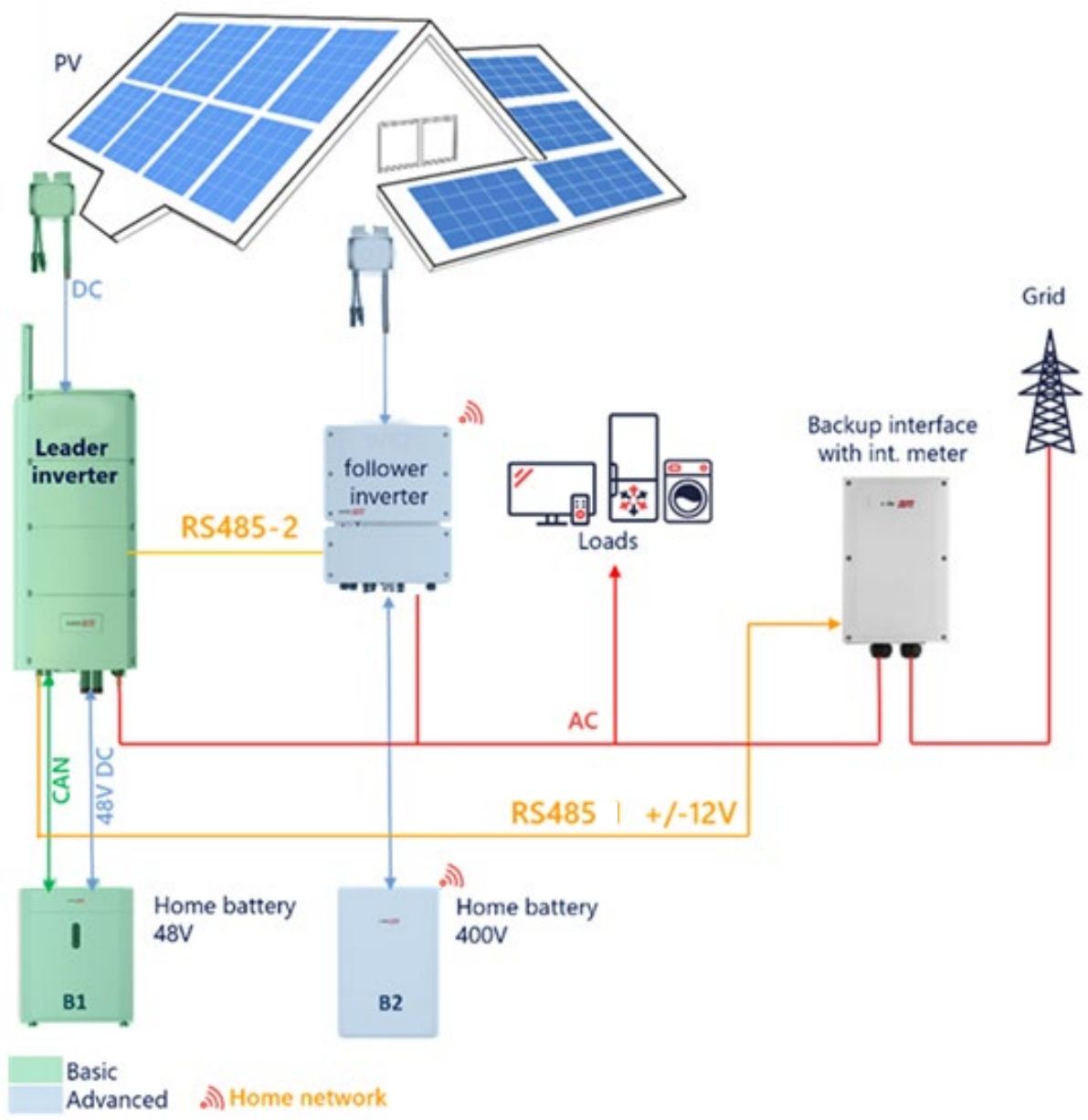

Figure 8 Installation of Home Hub Three Phase Inverter with a StorEdge Single Phase Inverter

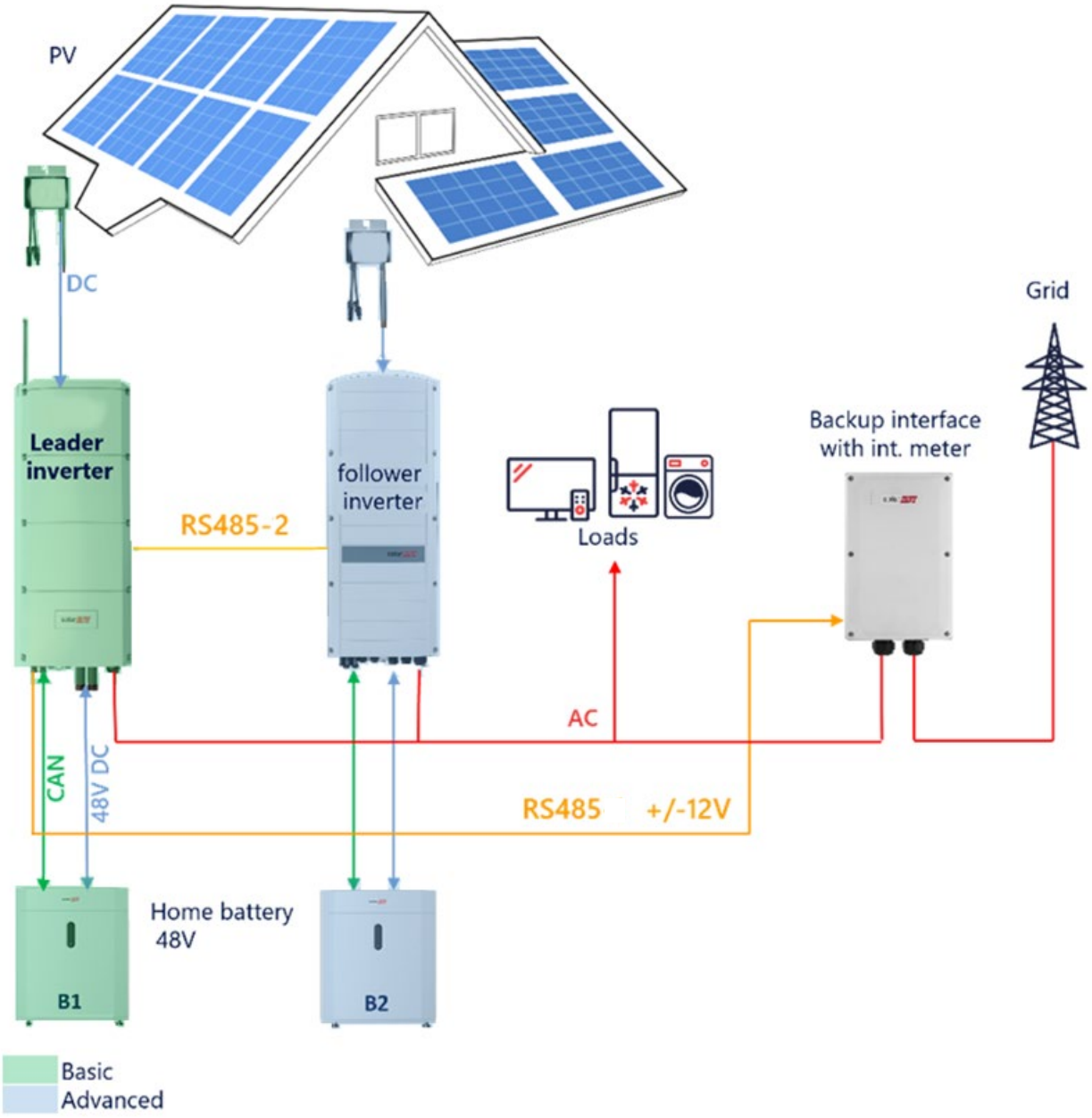

Figure 9 - Installation of Home Hub Three Phase Inverter with a StorEdge Three Phase Inverter

System Configurations with Inverters and Batteries (Storage-only Installations)

Storage only installations refers to installations in which there is no Backup Interface installed, thus the system can produce only during On grid mode (e.g. grid is available). The leader inverter on this document is assumed to be “SolarEdge home hub inverter – three phase” and must have storage connected.
here is always an option to upgrade a storage only installation to a backup installation by adding the Backup Interface. For detailed information please refer to the Backup Interface installation and the commissioning section of the Home Hub inverter – three phase

DC-Coupled - Installation

The DC-coupled installation is based on one SolarEdge Home Hub Three Phase Inverter and is suitable for most residential systems. The main components are the SolarEdge Home Hub Three Phase Inverter, a SolarEdge energy meter, the SolarEdge Home Battery 48V, and Power Optimizers.

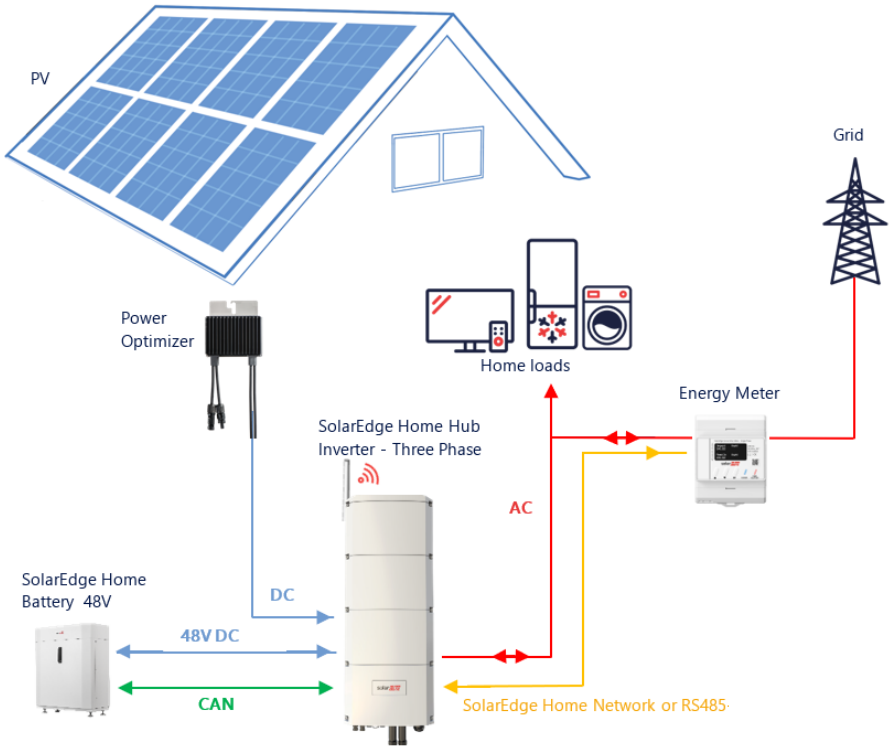

Figure 10 - DC-Coupled Storage-only installation

AC Coupling Using SolarEdge Inverters in Storage-only Installations

The figure below shows a site where a Home Hub Three Phase Inverter is AC-coupled with an existing SolarEdge Three Phase Inverter. In addition to AC-Coupling, the SolarEdge Home Hub Three Phase Inverter can also be connected to a string of Power Optimizers.

If the two inverters are not connected by Leader-Follower communication, working in Maximize Self-Consumption (MSC) mode is done by connecting a production meter to the AC output of the existing inverter and its communication to the SolarEdge Home Hub Three Phase Inverter (Leader). Connecting the meter to any inverter other than the Leader is not permitted. For detailed connection procedures refer to the installation guide for the inverter.

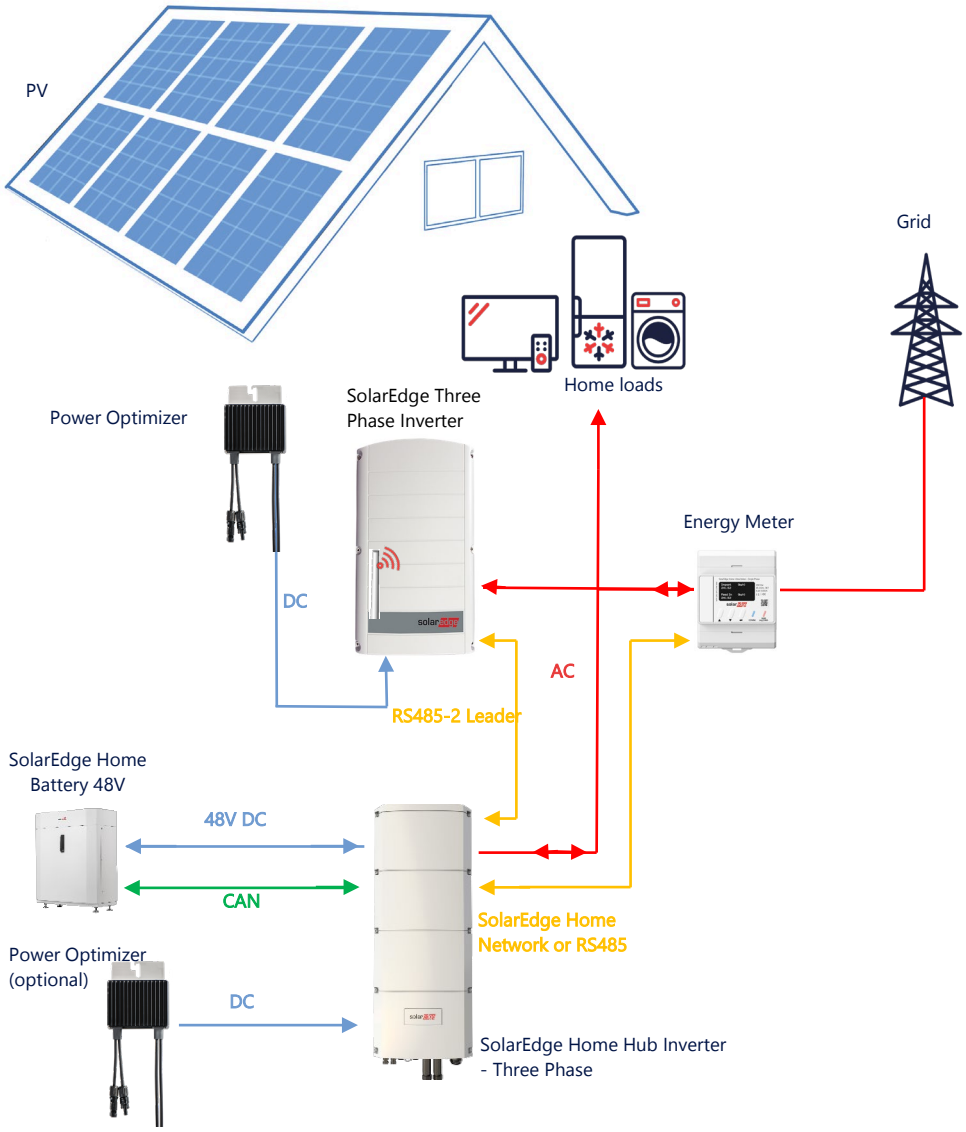

Figure 11 -Home Hub Three Phase Inverter AC-coupled to an Existing SolarEdge Three Phase Inverter

AC-Coupling - Multiple Three Phase Inverters in Storage-only Installations

For sites that require additional storage capacity and more power, up to three inverters can be used. The Leader MUST be a Three Phase Home Hub inverter connected to a battery, while the other inverters may be connected to a battery. The Leader inverter MUST be connected to a PV string. All inverters MUST be inter-connected to provide MSC mode.

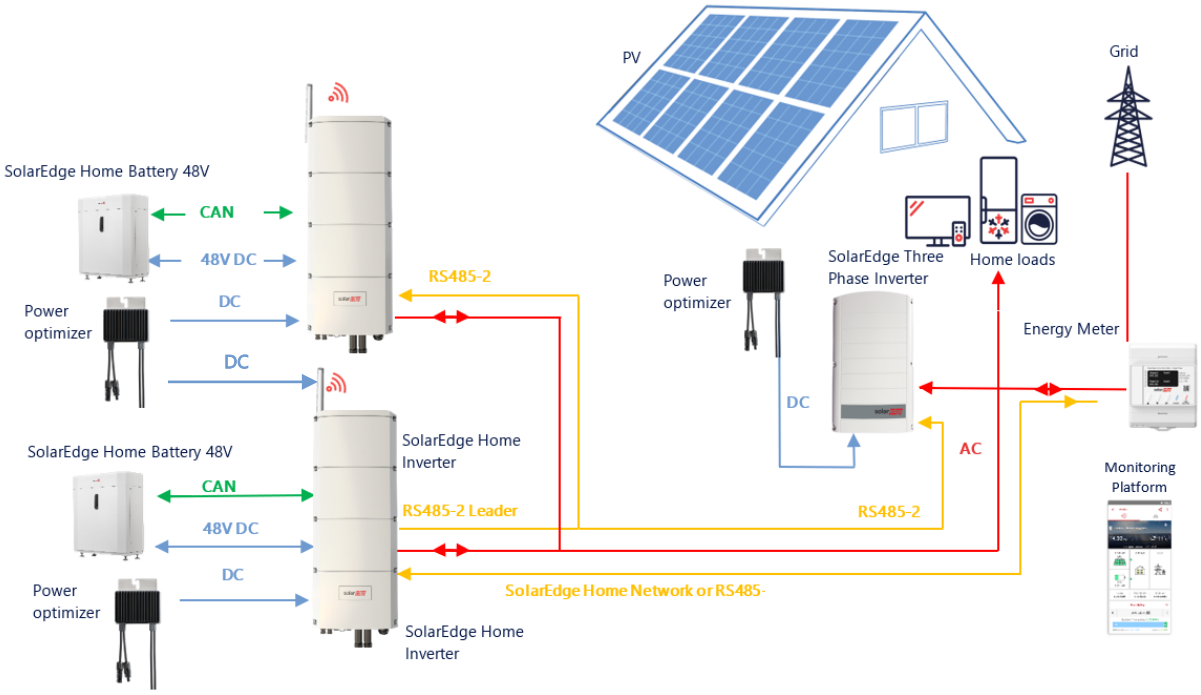

Figure 12 - AC-Coupling - Multiple SolarEdge Three Phase Inverters

Up to three SolarEdge Inverters may be connected to PV strings or can be AC-Coupled to a non-SolarEdge power source. In this configuration, no more than three inverters can be connected in a Leader-Follower configuration.

AC-Coupling using a Third-Party Power Source in Storage-only Installations

For sites that already have a third-party solar inverter or a Combined Heat and Power (CHP) unit, the Home Hub Three Phase Inverter may be AC-coupled to an existing power source. In addition to the AC-Coupling, the Home Hub Three Phase Inverter may be connected to PV strings. In this configuration, Export Limit is not supported.

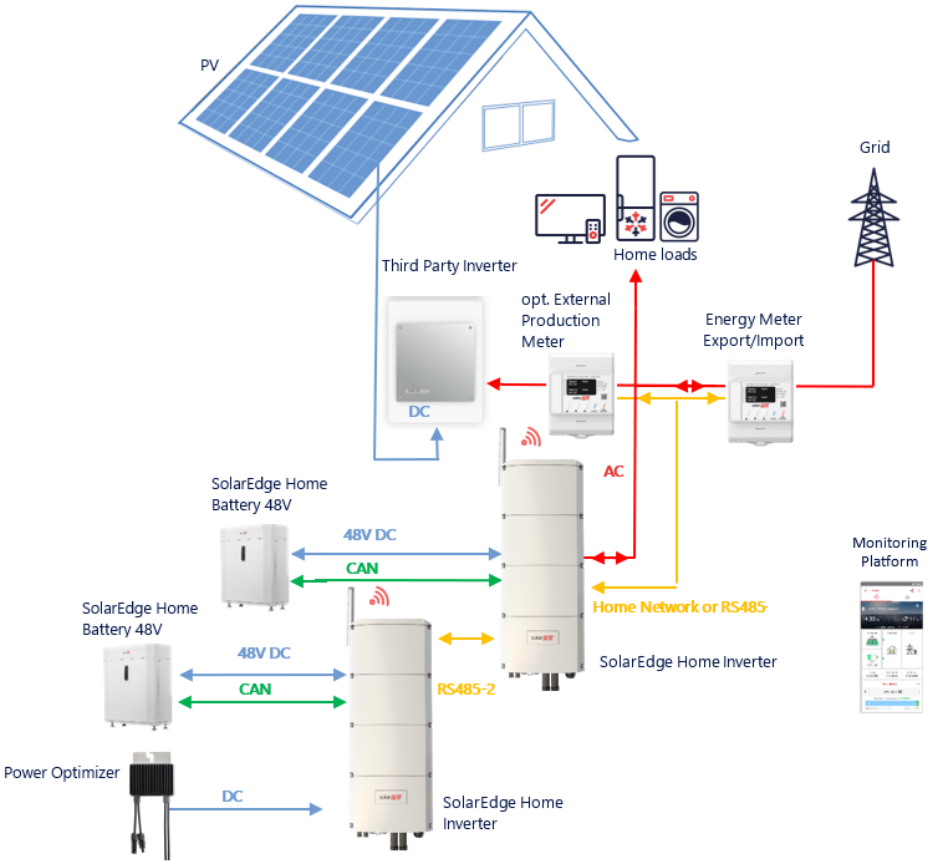

Figure 13 -AC-Coupling using a Third-Party Power Source

Storage Mode Compatibility Information

The following table lists the applications that can be used for each system configuration:

	Maximize Self-consumption	Battery Profile	Export Limitation	Zero Export Limitation
Smart SolarEdge Home Hub Inverter – Three Phase Configuration	✓	✓	✓	✓
Smart Energy	✓	✓	✓	×*
AC-Coupled Systems	✓	×	✓	×*

* These applications require a certain amount of Export power to work, due to the control accuracy of Smart Energy components or external power sources.

Support Contact Information

If you are having technical problems concerning SolarEdge products, please contact us:

https://www.solaredge.com/service/support

Before contacting SolarEdge, make sure to have the following information at hand:

- The model and serial number of the product in question.
- The error indicated on the LEDs, the SetApp mobile application, the LCD screen, or on the monitoring platform, if there is such an indication.
- System configuration information, including the type and number of modules connected and the number and length of strings.
- The method of communications with the SolarEdge server if the site is connected.
- The product's software version appears in the ID status screen.