Configure and Operate Home Load Controller for North America — Application Note

This application note explains how to configure load control devices and the available operating modes for your customers. This note also presents a sample of use cases for the Home Load Controller. Before configuring, make sure you correctly installed the SolarEdge Home Load Controller and contactor inside a NEMA-rated enclosure. For details, see Install Load Control Devices.

Revision history

- Version 1.3, March 2024: Included supported inverters and firmware update
- Version 1.2, Supports ten control devices
- Version 1.1, November 2023: Single inverter or site supports a total ten load control devices
- Version 1.0, July 2023: Initial version

Overview

The SolarEdge Home Load Controller regulates household energy consumption. You connect load control devices to the system to optimize power consumption requirements. These devices allow you to increase self-consumption, decrease energy costs, and manage grid outage events to optimize backup duration and avoid system overloads at sites.

Supported inverters

The following Residential inverters with SetApp configuration are supported:

- Home Wave inverters
  - SE3000H-US
  - SE3800H-US
  - SE5000H-US
  - SE5700HUS
  - SE6000H-US
  - SE7600H-US
  - SE10000H-US
  - SE11400H-US
- Home Hub Inverters
  - SE3800H-US
  - SE5700H-US
  - SE6000H-US
  - SE7600H-US
  - SE10000H-US
  - SE11400H-US

Firmware compatible operations

The following table lists the supported operations for each firmware version:

	Firmware version	3.x.xx	4.19xx
	Supported Devices	N/A	Home Network
Operations	Manual Operation	×	✓
	Scheduling	×	✓
	Smart Schedules	×	✓
	Excess PV	×	✓
	Essential devices	×	✓

NOTE

- EV chargers are included as Essential devices.
- *SolarEdge Home Network load control devices cannot be combined with inverters that do not allow the use of SetApp and the SolarEdge Home Network Card.
- Energy Management can be used in accordance with the energy limitations. For details, see Export Limitation Application Note.

Application functionality

The following table lists the functions for SetApp, the Monitoring platform, and mySolarEdge.

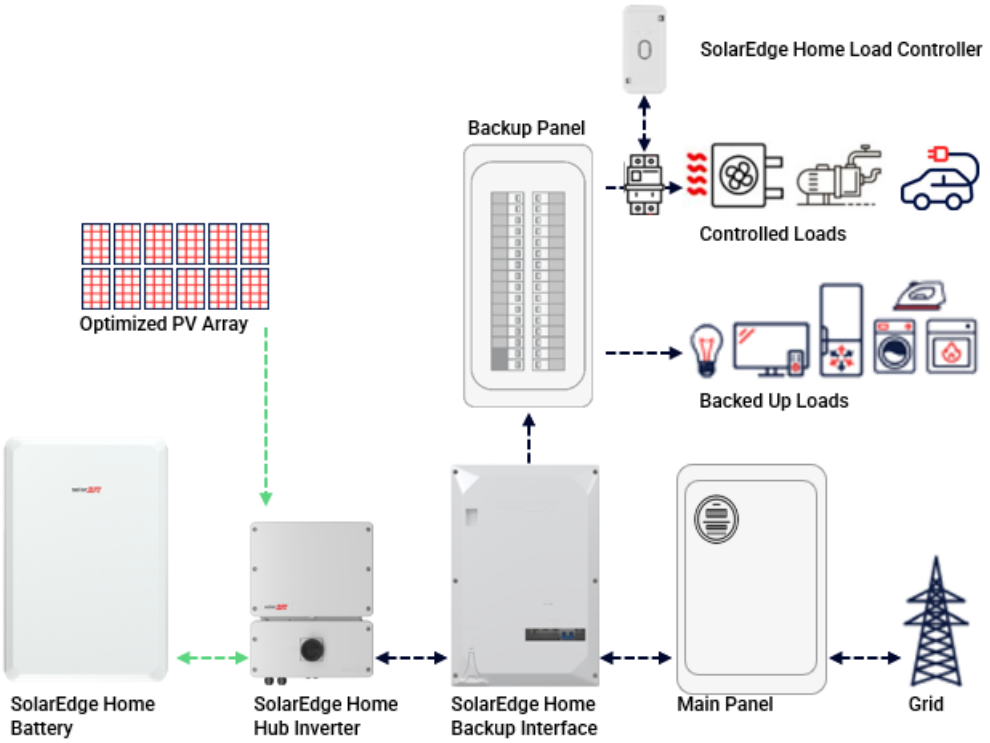
	Application	SetApp	Monitoring platform	mySolarEdge
Functions	Add, remove, and restore devices with SolarEdge Home Network	✓	×	×
	Manual operation	✓	✓	✓
	Simple and Smart scheduling	×	✓	✓
	Excess solar power configurations	×	✓	✓
	Firmware upgrade	✓	×	×

NOTE

- SetApp enables you to add load control devices to the system and manually validate their operation.
- System configuration is primarily completed with the Monitoring platform, however you can configure minimal settings with SetApp.
- You have the option to assist the homeowner in configuring application functionality in mySolarEdge.

Use Case Application and Examples:

You can use the Home Load Controller to manage backup loads and on-grid applications detailed in the following system diagram.



Examples of maximizing self-consumption

This table displays maximizing self-consumption example, modes and benefits.

Energy management	Operation mode	Benefits	Examples of loads
Peak avoidance	Smart Scheduling	Set the Home Load Controller to turn OFF during peak hours.	▰ Pool pumps ▰ Hot tubs ▰ Non-solar EV chargers ▰ HVAC equipment ▰ Electric clothes dryers ▰ Resistive water heaters
Non-export maximization or NEM3/NBT	Smart Scheduling with excess solar power configuration	▰ Turn ON loads to use excess solar energy. ▰ Turn OFF loads during peak export times (ideal use of the Home Load Controller). ▰ California gives a	▰ Pool pumps ▰ Hot tubs ▰ Non-solar EV chargers ▰ HVAC equipment ▰ Electric clothes dryers ▰ Resistive water heaters

Energy management	Operation mode	Benefits	Examples of loads
		financial incentive to discharge batteries to the grid at specific times. - NEM3/NBT outlines the rate structures for the investor-owned utilities of California. - Incentives to export excess PV energy to the grid are rare.	
Demand shaving	Smart Scheduling with Excess PV mode	- Avoid high demand charge by automatically turning OFF loads. - Residential utilities that offer rates that include demand charges,	- Pool pumps - Hot tubs - Non-solar EV chargers - HVAC equipment - Electric clothes dryers - Resistive water heaters

Optimize back up energy

The SolarEdge Load Controller is set as a Nonessential device by default. When a system switches to backup mode, the nonessential load turns off. This allows you to install smaller backup systems and reduce the amount of electrical work while onsite.
The following are examples of some of the circuits that can be controlled:

- HVAC Equipment
- Pool Pumps
- Hot Tubs
- Non SolarEdge EV Chargers
- Electric Clothes Dryers
- Resistive Water Heaters
- Geothermal pumps
- Sub Panels
- Non SolarEdge Inverters

Commission devices in SetApp

You can add load control devices, manually validate them, and establish encrypted

communications with SolarEdge Home Network.

NOTE

- A single site or inverter supports up to ten load control devices.
- Encrypted communication can take up to one minute to establish.

To add a device in SetApp:

1. Open SetApp and connect to the inverter by scanning the QR code.
2. Move the **ON/OFF/P** switch on the inverter in the P direction and tap **Continue** to establish Wi-Fi connection with the inverter.
3. From **Device Manager**, go to **Detected Devices** and select the required devices and tap **Add Selected.** Any mandatory firmware updates are automatically installed.
4. Configure the mandatory parameters according to the table below:

Mandatory SetApp parameters

Parameter	Description
Device power rating	Configures: - Devices without power management for values up to 50.000W - Devices with energy measurements limited to the maximum power of the device's nameplate - The device power rating for excess energy operation mode
Minimum On Time	- Avoids toggling ON/OFF/ON when excess PV fluctuates due to weather conditions or home consumption. - Sets the correct value for the load. For example, heat pumps require a **Minimum On Time** to guarantee the lifetime of the product.

The selected devices appear under **Recently Added.** Unselected devices are moved to **Hidden Devices.**

NOTE

- **Minimum On Time** is only relevant for ON/OFF devices.
- Level control devices do not require **Minimum On Time** — you can level them to 0% consumption if needed. For example, the EV charger has a fixed **Minimum On Time** of one minute and a minimal start threshold of 6 Ampere.

Additional functions in SetApp

You have the option to configure the following functions in SetApp.

Functions	Description
More info	How to identify/reset/override the device LED behavior Product-specific options, such as the boost function for hot water controllers
Blinking LED	The device LED blinks for 30 seconds. It is used to locate a device on-site when multiple devices are installed next to each other.

You have completed Commissioning in SetApp.

NOTE

Homeowners configure operation modes for devices in mySolarEdge.

Operate systems in the Monitoring platform

After adding devices to SetApp, you can configure operating modes in the Monitoring platform during the initial commissioning.

NOTE

The homeowner can make changes to the operating modes in mySolarEdge.

There are four operating modes available in the Monitoring platform. You can set the modes according to your preference, but the order of priority is as follows:
Manual Control > **Schedule** > **Smart Save** > **Excess PV**

To set the device operating mode:

From the Monitoring platform go to the site > **Smart Home** view and set the required device according to one of the following modes:

Operating modes

Mode	Description
Manual Control	Consumes energy from PV, storage, or grid depending on its availability. Consumption is unlimited and at 100% power.
Schedule	Consumes energy consumption from PV, storage, or grid depending on its availability.
Smart Save	Consumes excess solar production before importing energy from the grid.
Excess PV	Consumes energy from PV only according to the excess PV priority table and the configured power rating.

Set Manual Control

You can override the operating mode or schedule, and manually turn **ON/OFF** the device in the Monitoring platform.

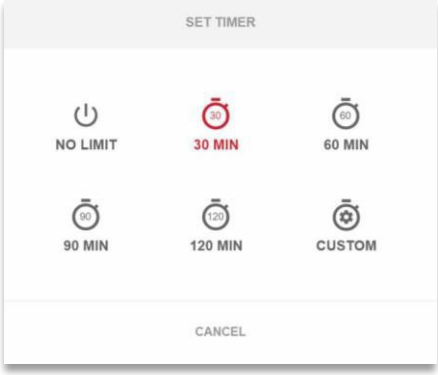
To set ON or OFF mode:

1. In **Smart Home** view, select the required device and click **ON** or **OFF**.

2. Select one of the following settings:

ON mode Settings

Setting	Description
NO LIMIT	The device turns **ON** and remains **ON** until the mode is manually changed (default).
30/60/90/120 MIN	The timer runs for the defined period. After the period finishes: - If the device was initially set to **AUTO**, it turns **OFF** according to the configured schedule - In any other instance, the device turns **OFF**
Custom	- A timer (hh:mm) is displayed - Configure the required time frame and tap **SET TIMER** - The device turns **ON** and remains **ON** for the configured period



3. Click **Apply**.

Set AUTO mode in the Monitoring platform

AUTO mode offers you the ability to create customized schedules and define PV consumption for devices.

To enable AUTO mode:

1. In **Smart Home** view, select the device and click **OFF** to expand the options.
2. Then click **AUTO**.

AUTO mode activates the following modes:

- Schedules
- Excess solar power
- Smart Save

Configure Schedules and devices in AUTO mode:

To enable/disable a schedule:

1. In the device, click on the three dots to expand its configurations.
2. Select or deselect the toggle button to enable or disable a schedule.

To edit an existing schedule:

1. In the device, go to **Schedules** and click the three dots next to the required schedule.
2. Adjust the **Start Time** (hh:mm) and **End Time** (hh:mm).
3. Select or deselect the **Days**.
4. Click **Apply**.

To add a schedule:

1. In the device, click on the three dots to expand its configurations.
2. Go to **Schedules** and click **Add Schedule**.
3. Enter the **Start Time** (hh:mm) and **End Time** (hh:mm).
4. Select the **Days**.
5. Click **Apply**.

To delete a schedule:

Click on the three dots next to the required schedule and then click **Delete**.

NOTE

You can set a maximum of four schedules.

To enable Excess solar power mode

Toggle on **Excess solar power mode**.

To define the device's Details and Settings:

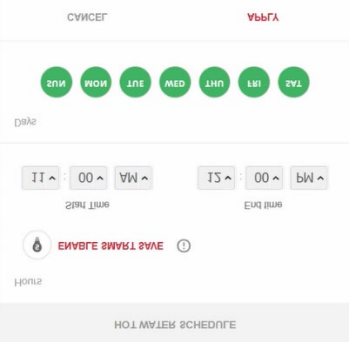
1. From the required device, go to **Details and Settings** and click **Edit Configuration.**
2. Enter a Name for the device and select an icon. The default name is the device's serial number.
3. **Rated Power** and **Min active time** display as configured in SetApp**.** You have the option to edit these settings.
4. Click **Apply.**

Set Smart Save mode with Ready-by Timer

The Smart Save mode is a hybrid schedule that uses excess solar production before importing energy from the grid. For example, you can configure the total operating time to be a combination of three hours with a **Ready by** timer set at 13:00. If there is one hour of excess PV before 13:00, then there are two operating hours left until it finishes. At 11:00, the device turns **ON** to finish its required operating hours.

When the system operates without excess PV and finishes the scheduled hours, any available energy source is used, including batteries. Smart Save has a higher priority and therefore operates before storage is charged.

The Smart Save mode is set to **OFF** by default. You can move between normal and smart save schedules by clicking the green **S** icon**.** When the Smart Save mode is **ON**, the **Ready by** timer displays the time.



To enable Smart Save:

1. Click **Smart Save ON**.
2. Click **Total Time** to display the timer (hh:mm).
3. Set the timer to the minimum accumulated time the load remains on. For example, this ensures that the hot water [tank/pump] is heated to the correct temperature.

> **NOTE**
> This also sets the minimum amount (accumulated) of time the load is **ON** during the day.

4. Click **Ready by** to display the timer (hh:mm) and set the latest time for the scheduled energy to be diverted to the load.
5. Select the days to apply to the schedule. The default schedule is daily.
6. Click **APPLY**.
7. Verify that the device is set to **AUTO** mode.
   The device turns **ON** according to the defined schedules.

> **NOTE**
> When Schedule and Smart Save modes overlap, Schedule mode takes priority.

Set Excess Solar Power Usage

When solar production exceeds the amount of electricity needed to supply daily loads, excess solar energy is exported to the grid. To prevent excess electricity exporting, configure the system to consume or store electricity by scheduling smart devices, EV chargers, or batteries.

Automatic priority list

When you add Smart Energy devices to the system in SetApp, the devices are automatically prioritized based on device type and load rating. Level control devices take priority over ON/OFF devices and the load rating priority comes at highest rating first.

Examples of prioritized devices:

- **Level control devices:**
  - Batteries are always prioritized first
  - EV Charger (11 kW)
  - Hot Water (3.5 kW)

- **ON/OFF Devices:**
  - Load Controller (4kW)
  - Smart Switch (2kW)
  - Smart Socket (1kW)

When two devices have the same power rating, the device added first to SetApp has higher priority.

Device Examples

Type of device	Examples
Battery Storage	Batteries
Level Control	- Hot Water Controllers with high power ratings (highest priority) - EV chargers **NOTE** EV chargers have a minimal start current of 6A per phase. Other devices Consume excess PV until it reaches the minimal level.
ON/OFF	- Home Load Controllers with high power rating (highest priority) - Sockets - Switches

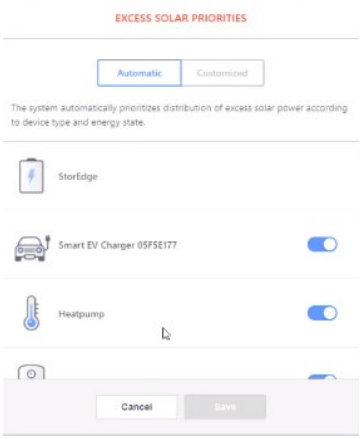
You can create a customized list for device priority in the Monitoring platform.

To edit an Automatic list:

1. In Excess Solar Priorities, click **Customized**.
2. Drag and drop the devices into the preferred order.
3. Enable or disable excess PV for each device.
4. Click **Save**.

To revert to device priorities set in SetApp:

1. In Excess Solar Priorities, click **Automatic**.
2. Drag and drop the devices into the preferred order.
3. Enable excess PV for each device.
4. Click **Save**.



NOTE

- You cannot configure devices without a power rating to operate on excess PV. Make sure to correctly set the power rating.
- When excess PV is enabled, the mode uses excess PV throughout the day in parallel to Schedules or Smart Save modes.

Manage devices during backup

You can define devices as **Essential** or **Nonessential** in the Monitoring platform. By regulating device modes, you can prevent the system from overloading during a backup transition or power outage.

Essential and Nonessential Device Settings

Device	Setting
Essential	The device remains in its operating state during a backup event — **ON/OFF/AUTO**
Nonessential	The device switches OFF for the entire backup transition state. After the system transitions to on-grid, devices are switched back to their previous state.

To manage devices during backup:

1. In **Smart Home** view, click **Essential Devices**.
2. Click the arrow to expand the lists for **Essential Devices** and/or **Nonessential Devices**.
3. Drag and drop the devices into the required lists.
4. Click **Save**.

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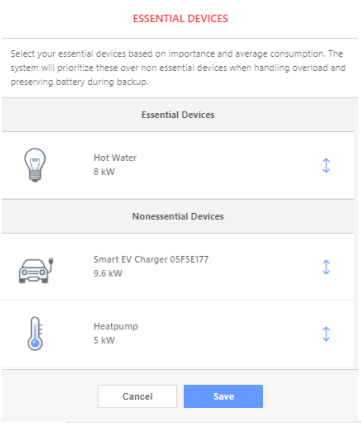

NOTE

- With a backup system, all load control devices are set to **Nonessential** by default. This enables validation for correct operation during backup transition.
- During backup, you can manually override and turn **ON** load control devices in the Monitoring platform during backup. If the system exceeds the available power or reaches phase imbalance, there is a risk of tripping the system.

Device behavior during backup transitions

The following table describes the type of device and its behavior during backup transitions.

Device type	State prior to power outage	State following power outage	State after grid is restored
Essential	ON/OFF	Remains **ON/OFF**	Returns to **ON/OFF**
Nonessential	OFF	Remains **OFF**	Remains **OFF**

When there is a power outage, the excess PV powers the battery and the home. Excess PV activation for load control appliances does not operate during a backup event.

You can configure an EV charger as an Essential device during backup. During the transition period and the first 30 seconds of backup, the EV charge power is at 50%. After 30 seconds, the EV charger reverts to the maximum configured charge rating.