

Application Note: SolarEdge Smart Energy Configurations and Operations

SolarEdge Home enables you to increase your site's self-consumption, decrease energy costs, and manage grid outage events to optimize backup duration and avoid system overloads. Connecting load control devices to the system automatically optimizes your consumption based on your needs. This document explains the supported system configuration, how it is configured, and what operating modes are available.

Version History

- Version 1.0 (May 2023)
 - Initial version
- Version 1.1 (July 2023):
 - Minimum on time, number of control devices parameters updated

Firmware Compatibility

	3.x.xx	4.10xx SolarEdge Zigbee devices	4.18.xx or higher SolarEdge Home Network devices
Manual Operation	×	✓	✓
Scheduling	×	✓	✓
Smart Schedules	×	✓	✓
Excess PV	×	✓	✓
Essential devices	×	×	✓

NOTE

- SolarEdge Home Network Load Control devices **cannot** be used with ZigBee devices on the same inverter or site.
- Storage or metering devices that communicate via the SolarEdge Home Network are supported in a joint installation with ZigBee load control devices on the same inverter or site.
- In multi-inverter systems, you should connect the load control devices to the leader inverter.

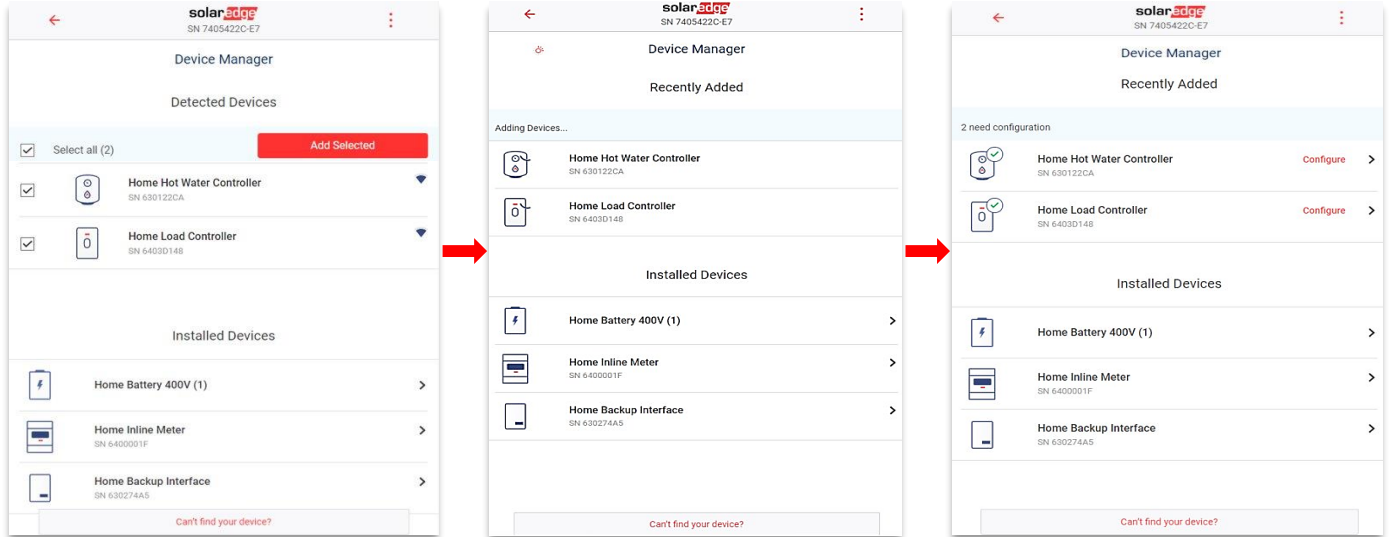
Application Functionality

	Set App	Monitoring Platform	mySolarEdge
Adding, removing, and restoring devices using SolarEdge Home Network	✓	×	×
Manual operation	✓	✓	✓
Simple and Smart Schedule	×	✓	✓
Excess solar power configurations	×	✓	✓
Essential devices configurations*	×	✓	✓
Firmware upgrade	✓	×	×

1. In the case of a backup system, all load control devices are set to "none essential" by default to allow validation of correct operation on backup transition. Changes to the configuration can be made on the monitoring applications and in mySolarEdge.
2. Energy Management can be used in accordance with the energy limitations. For more information click [Export Limitation Application Note](#).
3. SetApp enables you to add load control devices to the system and manually validate their operation. System configuration is completed via the mySolarEdge application and the monitoring web browser.
4. A total of 5 load control devices are supported on a single site or inverter.

System Configuration in SetApp

Select the device that you want to add and tap **Add Selected**. The device will be added to the SolarEdge Home Network and an encrypted communication will be established. Devices that are not selected will be moved to the "hidden devices" menu. Adding a selected device can take up to 1 minute per device before the encrypted connection is established, no limit in adding devices simultaneously. SetApp will verify whether the Firmware upgrade is necessary to ensure the optimal operation of the Smart device.



Mandatory Configuration Parameters

Device power rating:

- Values up to 50.000W can be configured for devices without power measurements.
- For devices that have energy measurements the power rating configuration is limited to the max nameplate of the device.
- For optimal operation ensure that the device power rating is configured correctly for the excess energy operating mode.

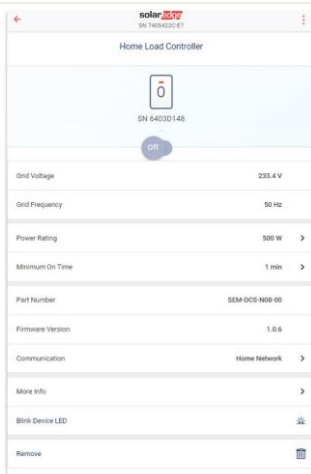
Minimum On Time:

- Avoids device toggling on/off/on when excess PV is variable due to weather conditions or home consumption.
- Loads such as heat pumps usually require a Minimum On Time to ensure the longevity of the product. Make sure that the value is set correctly.



NOTE

Minimum On Time is only relevant for ON/OFF devices, level control devices do not require Minimum On Time as we can level them to 0% consumption if needed. For the EV charger, a Minimum On Time of 1 minute is fixed as it has a minimal start threshold of 6 Ampere.



Additional Functionality

More info:

- How to identify/reset/override the device
- LED behavior
- Product-specific options, such as the boost function for hot water controllers.

Blink device 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.

The process is now complete. You can manually operate the device and verify the correct operational and electrical values. To complete the operational configurations, refer to the Monitoring platform or the mySolarEdge application.

System Operation in the Monitoring Platform and mySolarEdge

Once you have successfully configured the devices in SetApp, the following operating modes can be configured from the Monitoring platform during the initial commissioning. The homeowner can make the same configuration changes in the mySolarEdge application and grant remote access to his installer to assist with system configuration remotely if required.

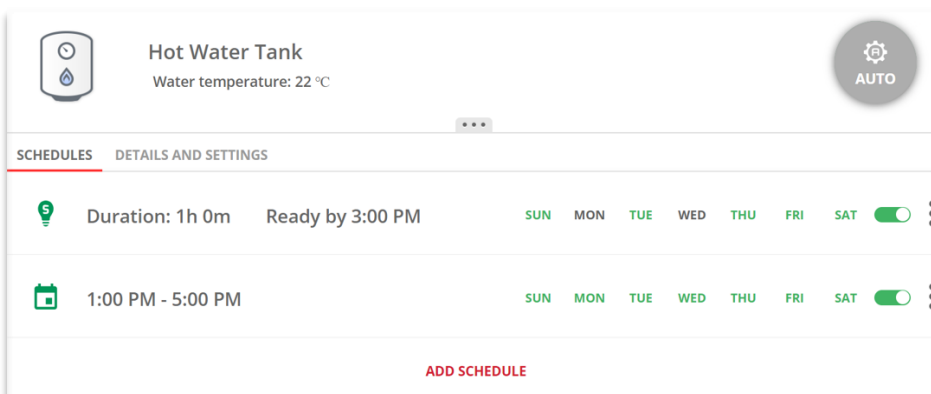
Operating Modes

Mode Priorities

When multiple modes are set in parallel, the priority of these modes is, as follows:

1. Manual Control: Energy consumption from PV, storage, or grid depending on its availability. Consumption will not be limited and will be at 100% power.
2. Schedule: Energy consumption from PV, storage, or grid depending on its availability.
3. Smart Save: Utilizing excess solar production before importing energy from the grid.
4. Excess PV: Energy consumption from PV only according to the excess PV priority table and the configured power rating.

Manual Control



It is possible to override any operating mode or schedule and manually turn ON/OFF the device.

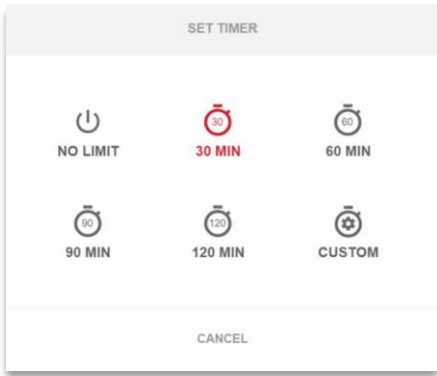
ON Mode

- **NO LIMIT:** The device turns ON and remains ON until the mode is manually changed (Default)
- **30/60/90/120 MIN:** The device turns ON and remains ON for the selected period.

At the end of the period:

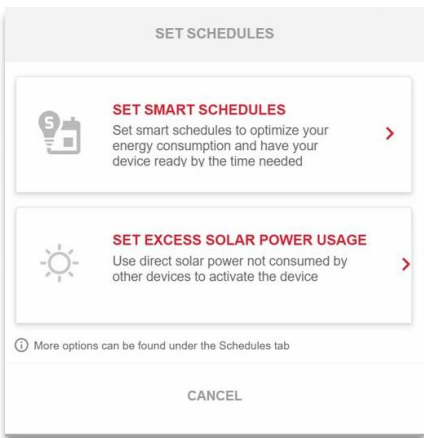
- If the device was initially set to **AUTO**, it will turn OFF according to the configured schedule.
- In any other instance, the device turns OFF.

- **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.



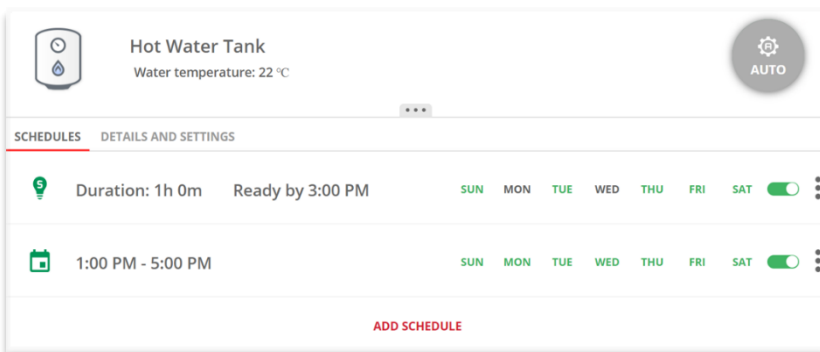
AUTO Mode

Select **AUTO** mode if a schedule, Smart Save or excess PV mode is configured. If these modes are not configured, the following screen is displayed:



Schedules and Smart Save


The system can operate according to a predefined schedule that is not linked to excess solar. You can define up to 4 schedules per device on multiple or single days of the week.





Delete, Edit or Add Schedules

Schedules can be configured, viewed, and edited from the device dashboard. Up to four schedules can be configured per device.

→ **To enable/disable/delete a schedule:**

1. To enable or disable a schedule, select, or unselect the toggle button  near the schedule name. Disabled schedules appear grayed out.
2. To delete a schedule, tap **DELETE**. Deleting all device schedules will turn the device off.

→ To edit a schedule:

1. If the schedule is disabled, enable it by selecting the toggle button  near the schedule name.
2. Tap the Schedule Settings icon . You can edit the following:
 - **Schedule** mode: Start and end times; days when the schedule should be applied.
 - **Smart Save** mode: Total and ready by times; days when the schedule should be applied.

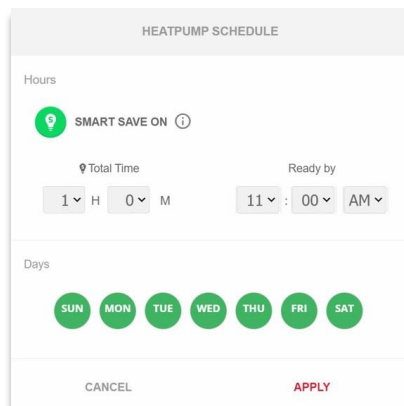
→ To add a schedule:

1. Tap the start time.
A clock is displayed. Configure the required start time.
2. Repeat for the end time. If the end time is earlier than the start time, the **ON** period will end the following day.
Example: If a start time of 23:00 and an end time of 19:00 are configured, the device will turn ON that day at 23:00 and turn OFF the following day at 19:00.
3. Select the days when the schedule should be applied (default: all days).
4. Tap Apply.
The system will automatically switch to **AUTO** mode.


Smart Save with Ready by Timers

The Smart Save mode is a hybrid schedule that utilizes excess solar production before importing energy from the grid. As an example, you can configure the total operating time to be 3 hours in combination with a ready-by timer set at 1 PM. If before 1 PM there is 1 hour of excess PV, it has 2 operating hours left to complete. At 11 AM the device will turn ON to complete its required operating hours. While operating without excess PV and to complete the required operating hours any available energy source will be used, batteries included. 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 .



If the Smart Save mode is ON, the time is displayed in the **Ready by** timer:

1. Tap the **SMART SAVE ON** button .
2. Tap **Total Time**.
A timer (hh:mm) is displayed.
3. Configure the minimum accumulated time the load must remain on to ensure the entire hot water tank has been heated to the desired temperature.
This also sets the minimum accumulated time the load is on throughout the day.
4. Tap **Ready by**.
A clock is displayed.
5. Configure the latest time for the requested energy to be diverted to the load.
6. Select the days to apply to the schedule. (Default set to all days).
7. Tap **APPLY**.
The system will automatically switch to **AUTO** mode.

You can configure up to four schedules per device. The device is set to ON according to the schedules selected.

**NOTE**

In case of overlapping Schedule and Smart Save modes, the Schedule mode takes precedence.

Excess Solar Activation

Throughout the day if solar production exceeds your required amount of electricity, any excess will flow to the electricity grid. To optimize and increase self-consumption, storage can be charged, or appliances can be turned on to avoid electricity flowing to the grid. Any smart device, battery, or EV charger can be configured in any position in the list.

Smart Energy devices that are added to the system are prioritized and automatically configured based on device type and load rating. A custom priority list can be configured in the monitoring or mySolarEdge.

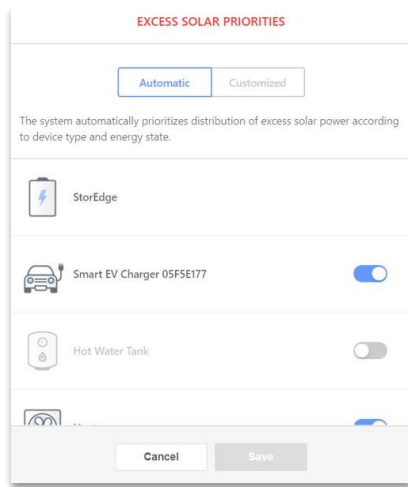
Automatic priority list

1. Battery Storage.
2. Level control devices such as EV chargers, or hot water controllers with high power ratings have the highest priority.
3. ON/OFF devices such as sockets, switches, and load controllers with high power ratings have the highest priority.



NOTE

EV chargers have a minimal start current of 6A per phase. Until this level is reached, other devices will consume excess PV.



NOTE



- Devices without a power rating set cannot be configured to operate on excess PV. Ensure the power rating is set correctly.
- When excess PV is enabled, it will utilize excess PV throughout the day in parallel to schedules, or smart save mode

Essential Device Management During Backup

To avoid system overloads during a backup transition and throughout the outage event, you can configure load control devices, as follows:

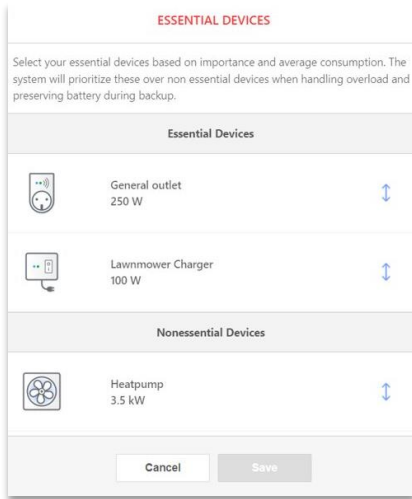
Essential:

- The device remains in its operating state in a backup event, as either ON/OFF/AUTO.

Non-Essential:

- The device is switched off upon backup transition and throughout the backup duration. When the system transitions to on-grid, the devices are switched to their state prior to the backup event.

Users can manually override and turn on load control devices throughout the backup duration.



NOTE



When you manually override devices that have been turned off, there is a risk that the system will trip as its consumption may exceed the available power or phase imbalance at any given time.

Essential Device Behavior on Backup Transitions

Device State Before Power Outage	Device State After Power Outage		Device State when Grid Back
	Essential	Non-Essential	
ON/AUTO	Remain in ON/AUTO	Turn OFF	Return to ON/AUTO
OFF	Remain OFF	Remain OFF	Remain OFF