FranklinWH NEM-MT System Configuration and Commissioning Guide

Background

Customers with existing Net Metered (NEM) PV systems who would like to add more PV generation, can avoid increased Net Billing Tariff (NBT) rates that would accompany NEM system interconnection changes; but only if the new additional PV generation is certified as non-exporting. This document describes the need, the solution, and the commissioning process for such additions.

Most often, NEM-Multiple Tariff (NEM-MT) systems are for a home with an existing solar photovoltaic (PV) system and where electrical demand has grown since the original installation. When the existing PV system is under a NEM-1 or NEM-2 contract, simply extending PV would mandate an NBT (NEM-3) contract for the entire system, which may negate the added value of new PV generation. Under NEM-MT, the home may have multiple types of PV subsystems, including both a NEM system and new non-exporting PV system. This prevents the economic losses of trading NEM value for NBT program/rates.

NEM-MT system design best practices typically size new non-exporting PV & ESS such that the non-exporting peak PV power above historical daytime minimum load requirements can be offset by the ESS charge power.

Currently, NEM-MT is limited to California. There is a similar program in Hawaii which is called NEM+.

1. Dynamic Export Limiting employs the same Power Control System (PCS) control of the ESS when used in non-export PV+ESS systems (PV **zero export**). PCS is qualified by NRTL and is recognized by the National Electric Code.
2. Solar self-consumption, or non-exporting PV with ESS having PCS controls, measures and monitors the difference between PV production and demand, issuing continuous charge or discharge commands to the ESS/PCS to maintain a *zero-export* condition in the system.
3. Using dynamic export limiting, the EMS/PCS of the new system will limit PV exports to zero at the connection to the existing load panel, using the independent production metering channels to differentiate the NEM reference from the non-exporting PV & ESS.

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The FranklinWH System logic is explained below. In all scenarios, the system maximizes export of the existing PV under the NEM contract to the grid.

1. When new PV output is less than the home loads: The system will use the new PV to supply the home loads and the remaining demand will be supported by the aPower. The order of load power supply is new PV, aPower, existing PV, utility grid. This ensures that existing NEM PV will not provide load until the newly installed PV and aPower are insufficient.
2. When new PV output is greater than home load demand and new PV output is less than the aPower charge rate, the system will first use the power of the new PV to supply loads, and the remaining new PV output will charge the battery. The NEM compliant PV will export to the grid.
3. When new PV output exceeds the combined home loads and aPower charge rating, the system will disconnect the new PV to prevent export of the new PV to the grid.
    a. While new PV is curtailed, the aPower(s) will discharge to serve loads up to the power rating, then NEM PV will offset loads, then the grid will serve loads.
    b. This ensures the new PV and aPower will not export to the grid.
4. When the total home load exceeds the combined output of the new PV and aPowers: the home loads will consume output from the existing NEM PV.

New PV on the Main Panel Load Side (Backup Side)

When installing a FranklinWH System with new PV at a site with an existing NEM PV installation connected on the main panel load side, follow the instructions provided for the appropriate scenario.

Note: *Follow the applicable FranklinWH installation guide for the products being installed. Refer to the FranklinWH Documentation Center to find the appropriate installation guide for the installed system configuration.*

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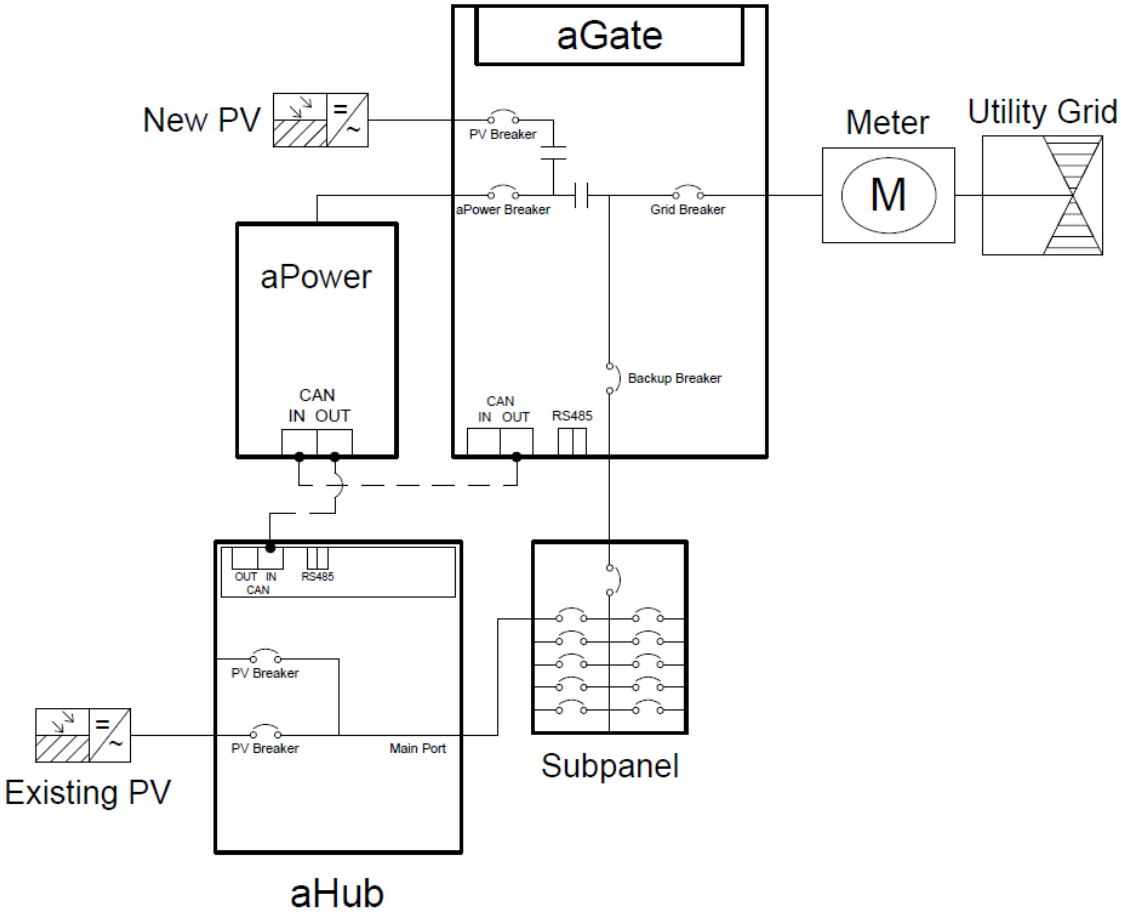
NEM-MT Configurations for aGate Systems

Scenario A: Existing PV via aHub and New PV Connected to aGate PV Port

The existing PV is connected to the backup panel via the aHub. The new PV is connected to the PV port on the aGate.

Note: *The total length of all CAN cables must be ≤ 164 ft (50 m) when devices communicate via CAN. For distances between 164 ft (50 m) and 328 ft (100 m), RS485 communications must be used.*



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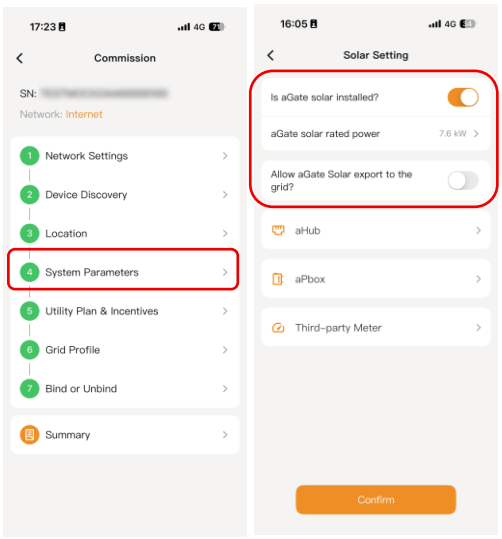
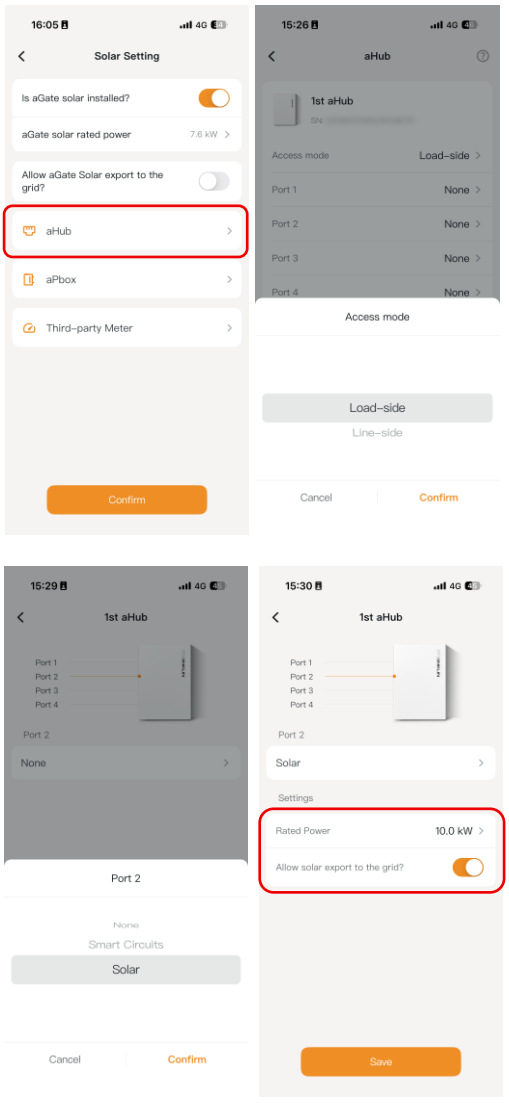
The commissioning steps are described below:

<table>
<tr><th>New PV</th><th>Existing PV</th></tr>
<tr>
<td>
1. Login to the FranklinWH App with the installer account.
2. Tap System Parameters > Solar Setting to configure the new PV settings.
a. Enable the Is aGate solar installed toggle.
b. Set aGate solar rated power.
c. Disable the Allow aGate Solar export to the grid toggle.


</td>
<td>
3. Tap the aHub bar to configure the existing PV settings.
a. Select Load-side as the access mode.
b. Configure Port 2 as the Solar.
c. Set the solar rated power.
d. Enable the Allow solar export to the grid toggle.
Note:
aHub Ports 2–4 can be configured as Solar. Port 2 is used as an example.


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</tr>
</table>

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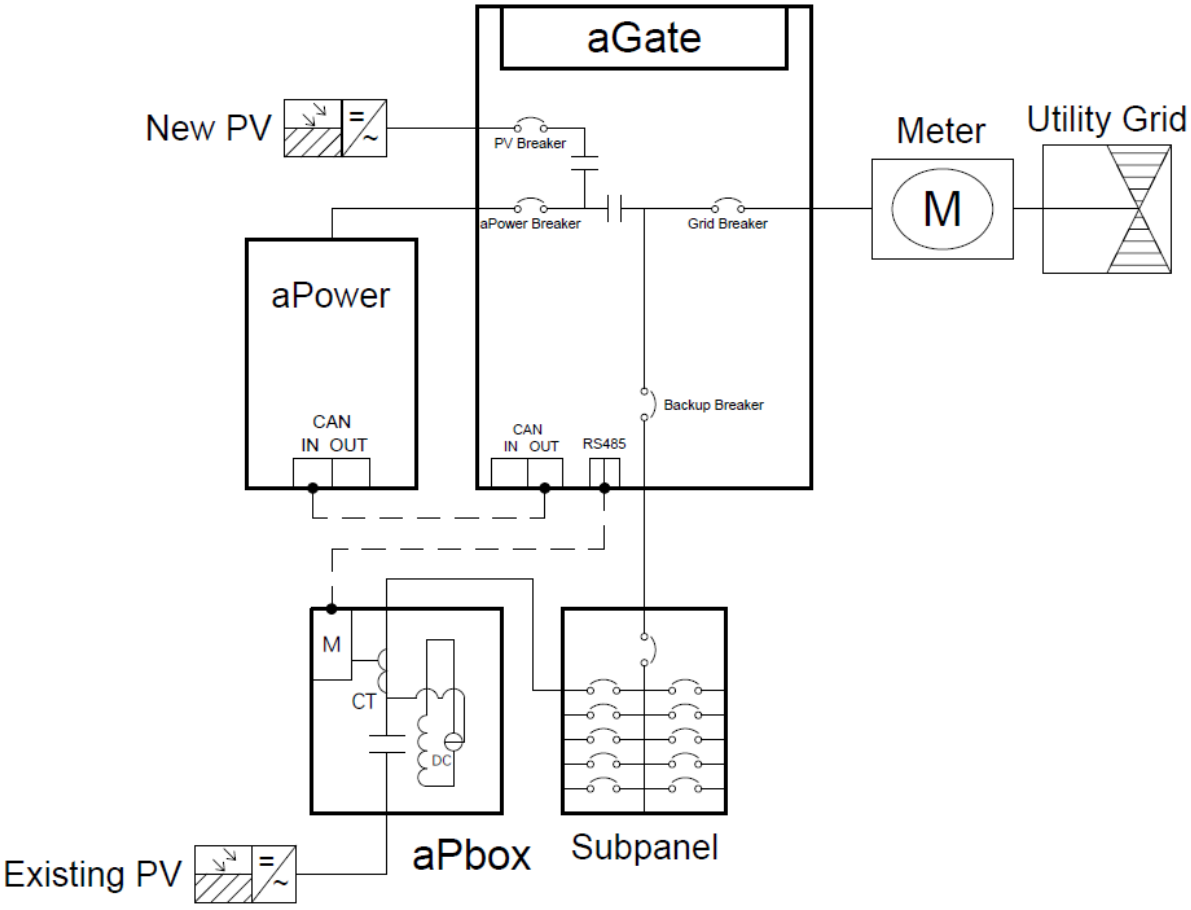
Scenario B: Existing PV via aPbox and New PV Connected to aGate PV Port

The existing PV is connected to the backup panel via the aPbox. The new PV is connected to the PV port on the aGate.



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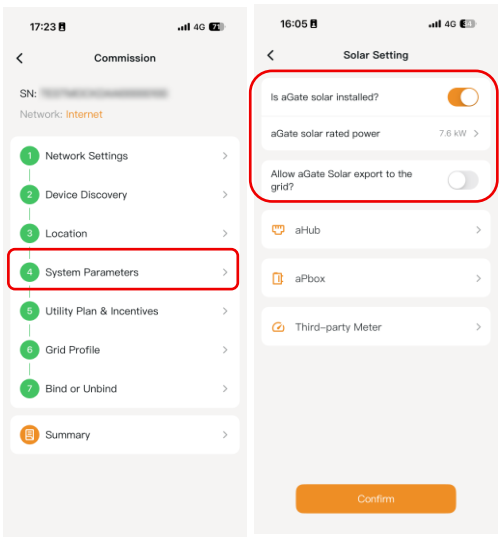
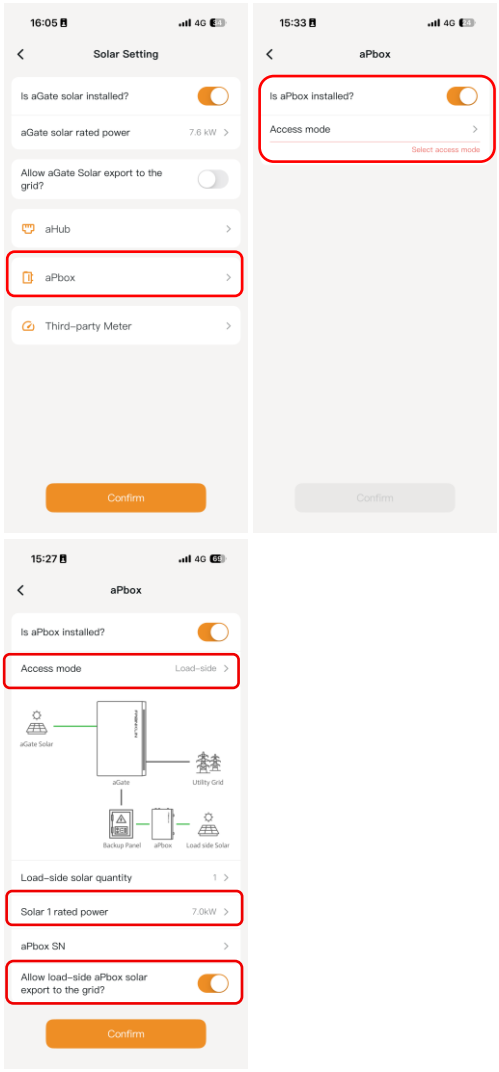
The commissioning steps are described below:

<table>
<tr><th>New PV</th><th>Existing PV</th></tr>
<tr>
<td>
1. Login to the FranklinWH App with the installer account.
2. Tap System Parameters > Solar Setting to configure the new PV settings.
a. Enable the Is aGate solar installed toggle.
b. Set aGate solar rated power.
c. Disable the Allow aGate Solar export to the grid toggle.


</td>
<td>
3. Tap the aPbox bar to configure the existing PV settings.
a. Enable the Is aPbox installed toggle.
b. Select Load-side as the access mode.
c. Set the solar rated power.
d. Enable the Allow load-side aPbox solar export to the grid toggle.


</td>
</tr>
</table>

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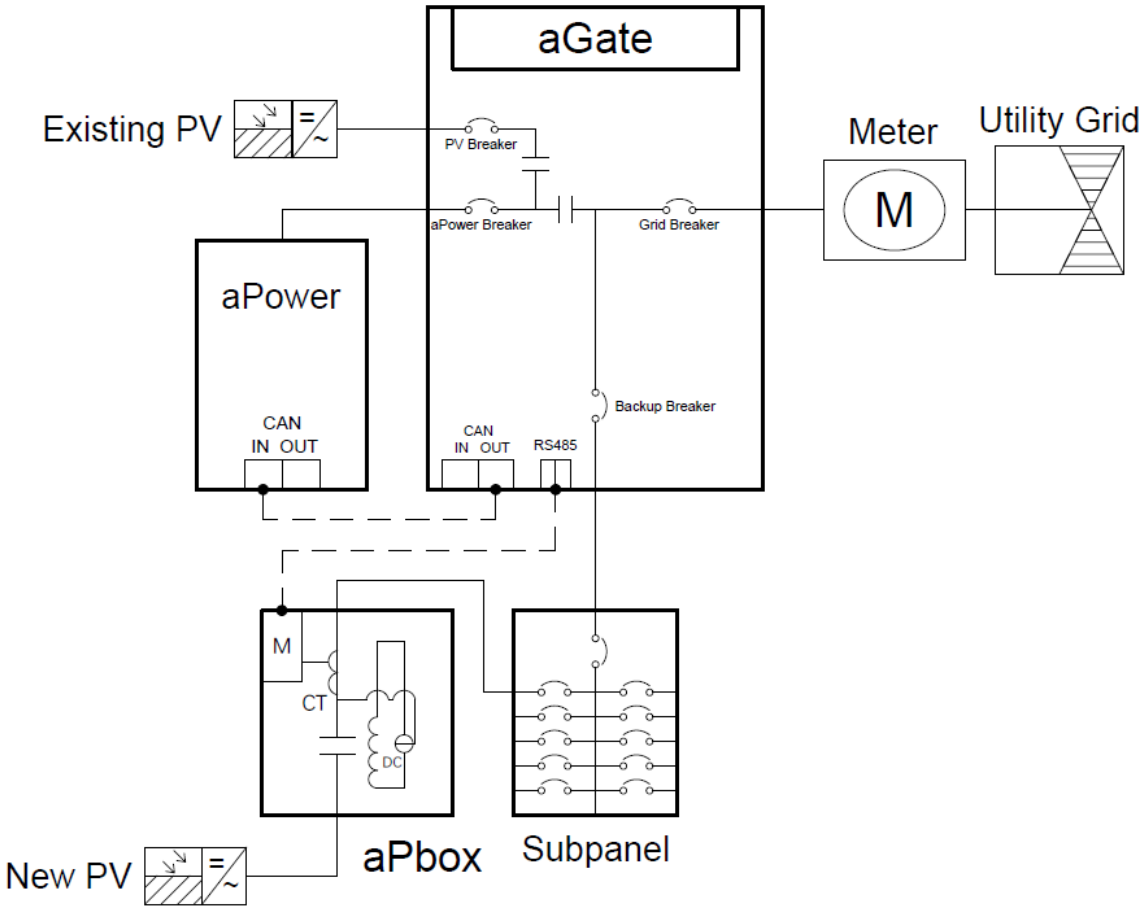
Scenario C: Existing PV Connected to aGate PV Port and New PV via aPbox

The existing PV is connected to the PV port on the aGate. The new PV is connected to the backup panel via the aPbox.



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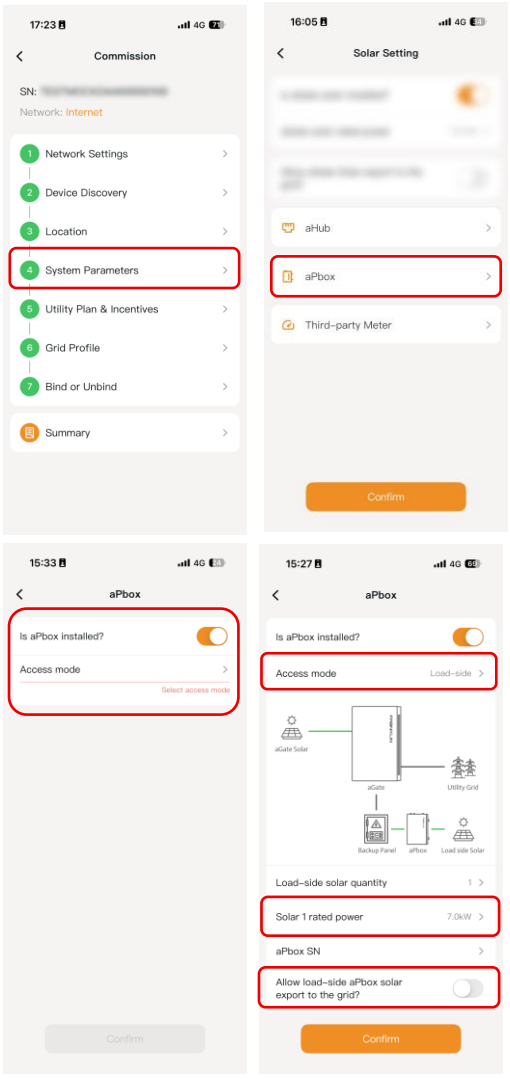
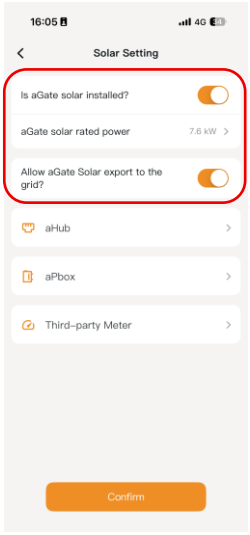
The commissioning steps are described below:

<table>
<tr><th>New PV</th><th>Existing PV</th></tr>
<tr>
<td>
1. Login to the FranklinWH App with the installer account.
2. Tap System Parameters > Solar Setting to configure the new PV settings.
a. Enable the Is aPbox installed toggle.
b. Select Load-side as the access mode.
c. Set the solar rated power.
d. Disable the Allow load-side aPbox solar export to the grid toggle.


</td>
<td>
3. Configure the existing PV settings.
a. Enable the Is aGate solar installed toggle.
b. Set aGate solar rated power.
c. Enable the Allow aGate Solar export to the grid toggle.


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</table>

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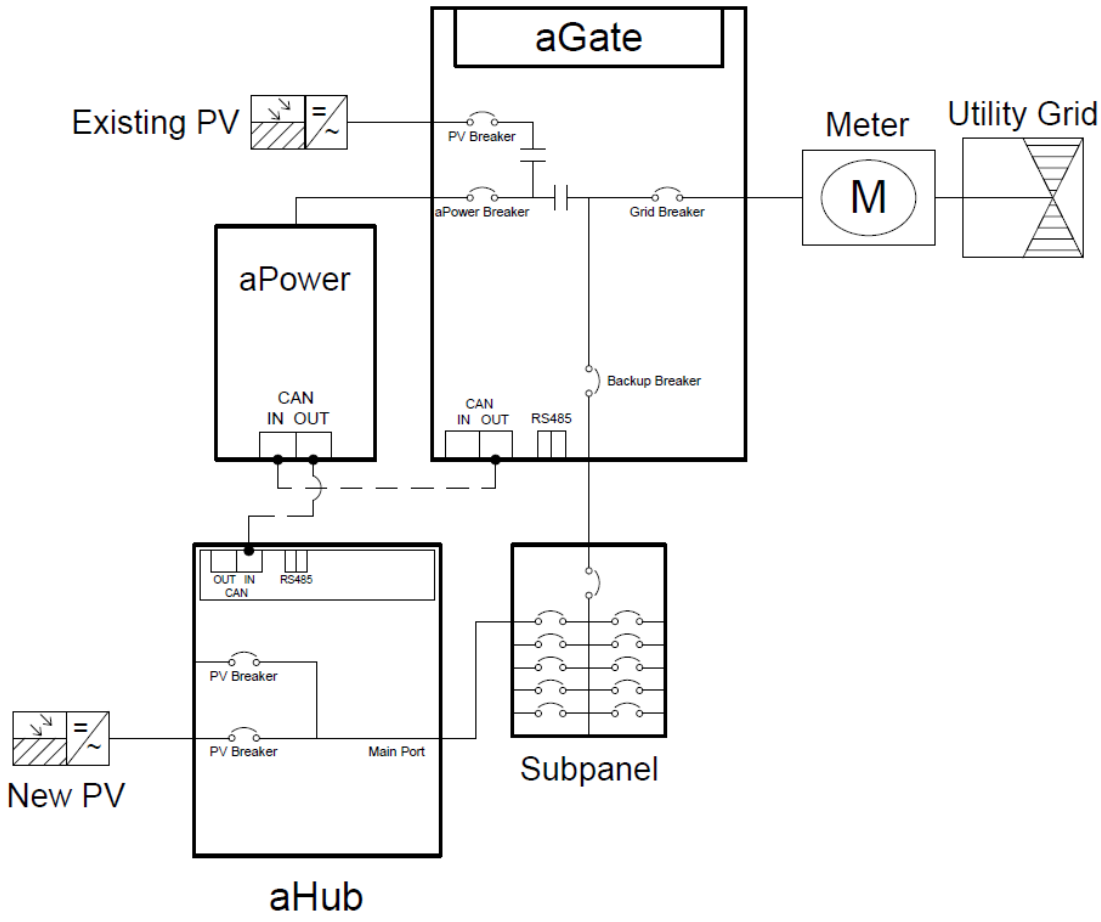
Scenario D: Existing PV Connected to aGate PV Port and New PV via aHub

The existing PV is connected to the PV port on the aGate. The new PV is connected to the backup panel via the aHub.

Note: *The total length of all CAN cables must be ≤ 164 ft (50 m) when devices communicate via CAN. For distances between 164 ft (50 m) and 328 ft (100 m), RS485 communications must be used.*



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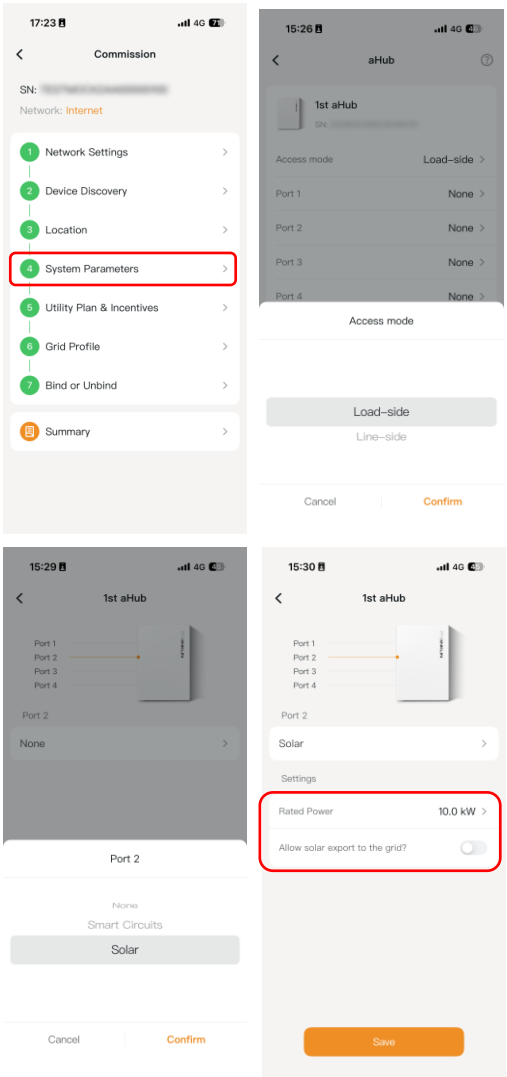
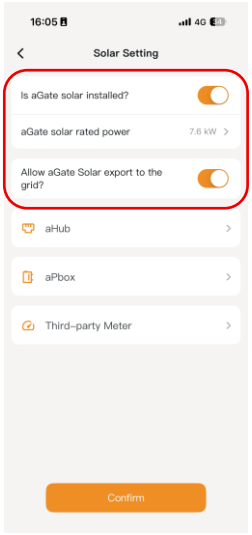
The commissioning steps are described below:

New PV	Existing PV
1. Login to the FranklinWH App with the installer account. 2. Tap **System Parameters** > **Solar Setting** > **aHub** to configure the new PV settings. a. Select **Load-side** as the access mode. b. Configure Port 2 as the **Solar**. c. Set the solar rated power. d. Disable the **Allow solar export to the grid** toggle. ***Note:*** *aHub Ports 2–4 can be configured as Solar. Port 2 is used as an example.* 	3. Configure the existing PV settings. a. Enable the **Is aGate solar installed** toggle. b. Set aGate solar rated power. c. Enable the **Allow aGate Solar export to the grid** toggle. 

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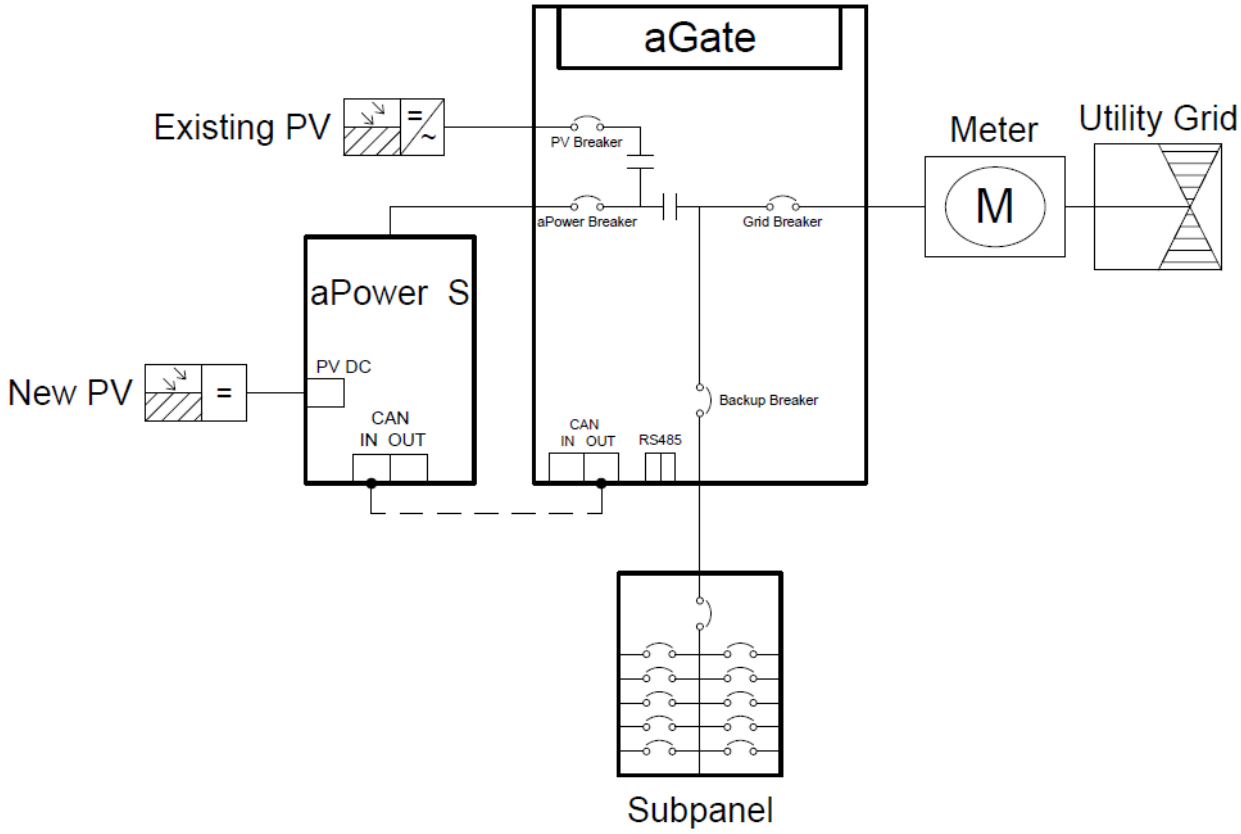
Scenario E: Existing PV Connected to aGate PV Port and New PV DC via aPower S

The existing PV is connected to the PV port on the aGate. The new PV DC is connected to the aGate through the aPower S.



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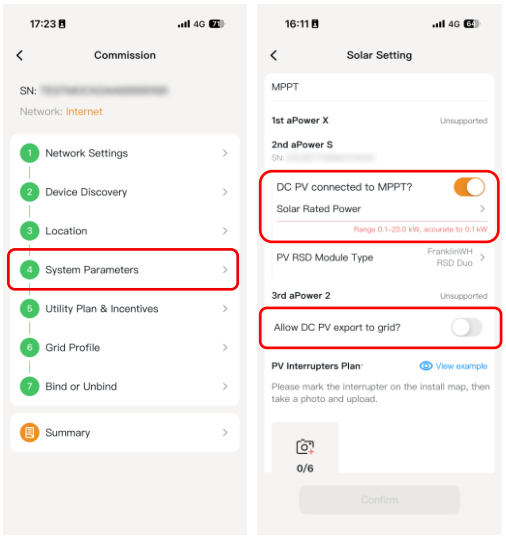
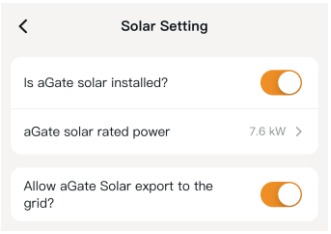
The commissioning steps are described below:

<table>
<tr><th>New PV</th><th>Existing PV</th></tr>
<tr>
<td>
1. Login to the FranklinWH App with the installer account.
2. Tap System Parameters > Solar Setting to configure the new PV settings.
a. Enable the DC PV connected to MPPT toggle.
b. Set the solar rated power.
c. Disable the Allow DC PV export to the grid toggle.


</td>
<td>
3. Configure the existing PV settings.
a. Enable the Is aGate solar installed toggle.
b. Set aGate solar rated power.
c. Enable the Allow aGate Solar export to the grid toggle.


</td>
</tr>
</table>

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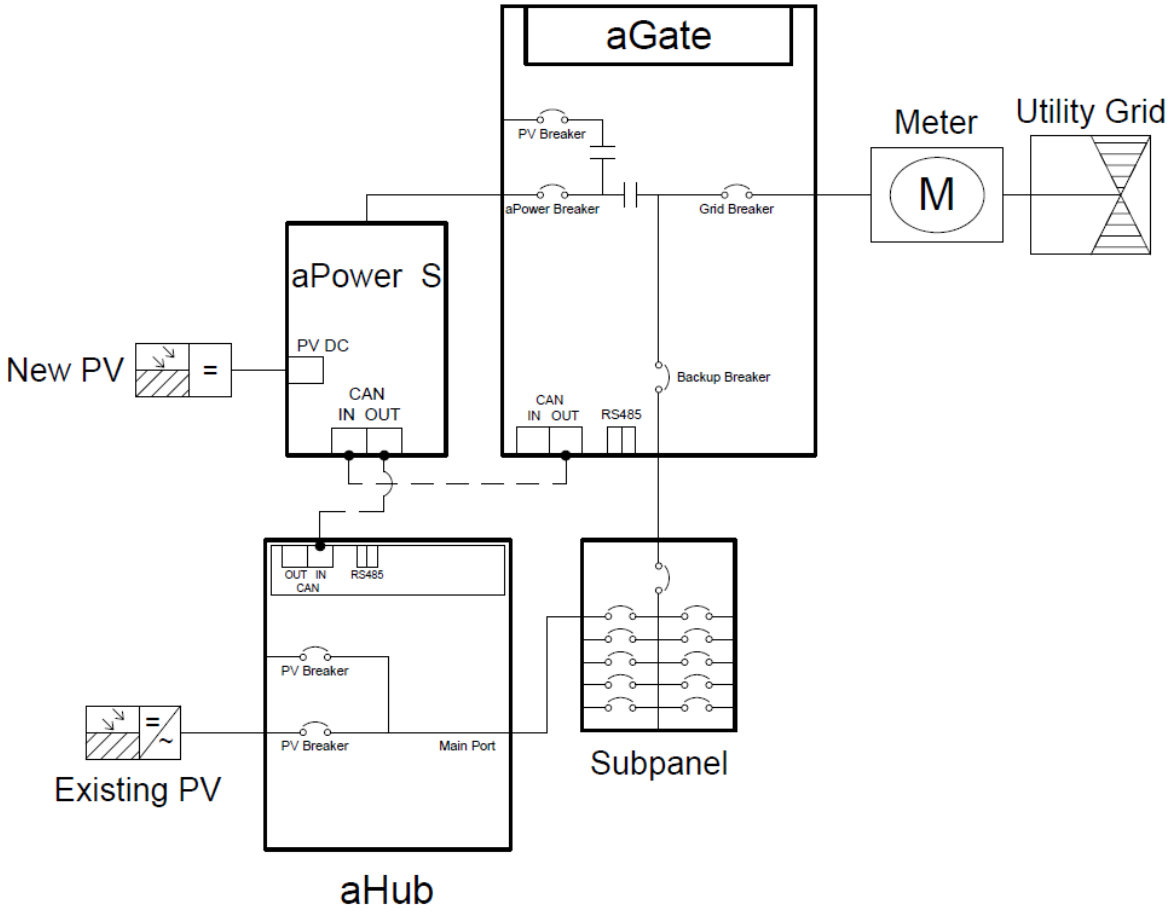
Scenario F: Existing PV via aHub and New PV DC via aPower S

The existing PV is connected to the backup panel via the aHub. The new PV DC is connected to the aGate through the aPower S.

Note: *The total length of all CAN cables must be ≤ 164 ft (50 m) when devices communicate via CAN. For distances between 164 ft (50 m) and 328 ft (100 m), RS485 communications must be used.*



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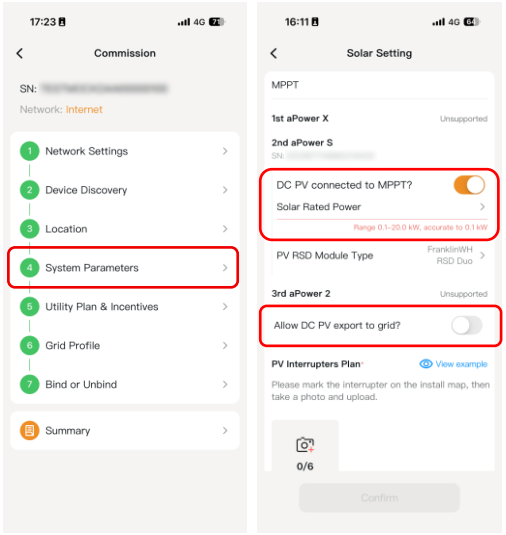
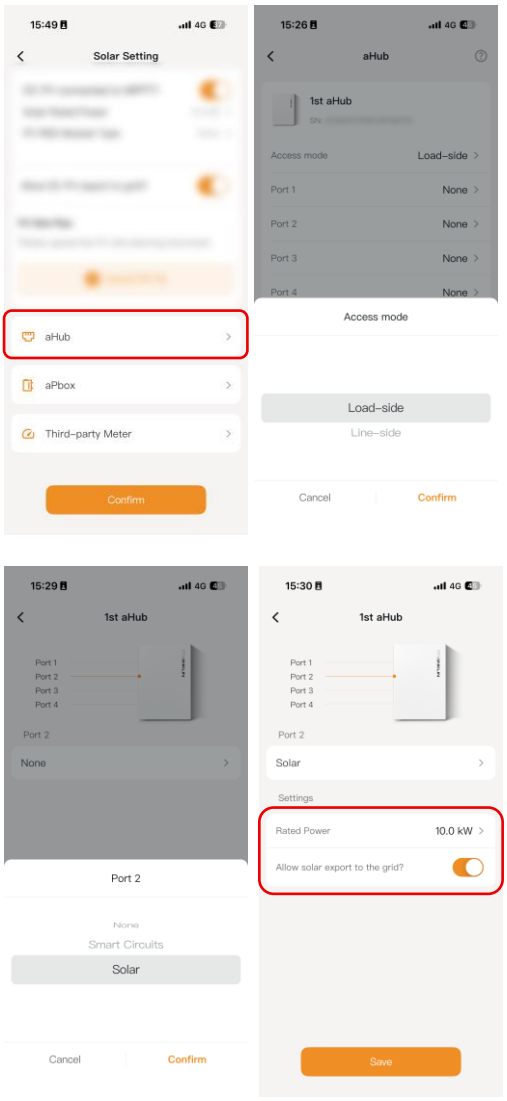
The commissioning steps are described below:

New PV	Existing PV
1. Login to the FranklinWH App with the installer account. 2. Tap **System Parameters** > **Solar Setting** to configure the new PV settings. a. Enable the **DC PV connected to MPPT** toggle. b. Set the solar rated power. c. Disable the **Allow DC PV export to the grid** toggle. 	3. Tap the **aHub** bar to configure the existing PV settings. a. Select **Load-side** as the access mode. b. Configure Port 2 as the **Solar**. c. Set the solar rated power. d. Enable the **Allow solar export to the grid** toggle. ***Note:*** *aHub Ports 2–4 can be configured as Solar. Port 2 is used as an example.* 

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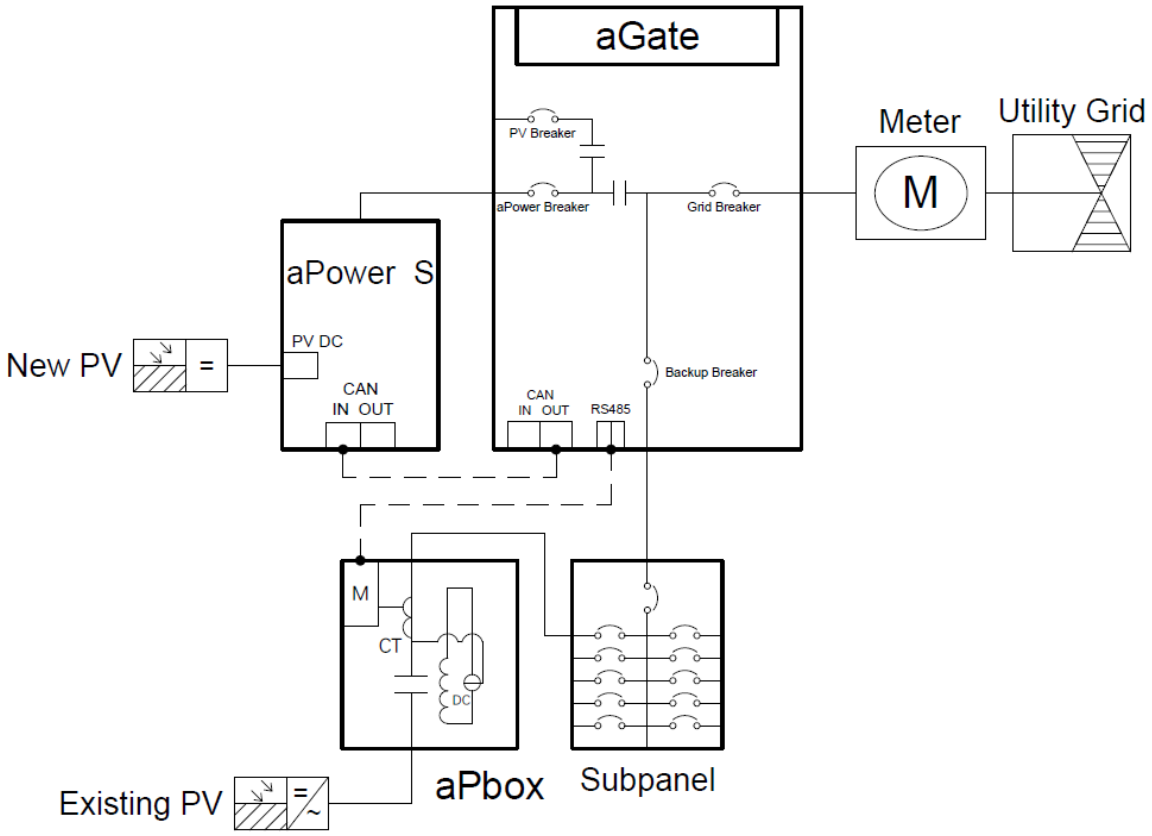
Scenario G: Existing PV via aPbox and New PV DC via aPower S

The existing PV is connected to the backup panel via the aPbox. The new PV DC is connected to the aGate through the aPower S.



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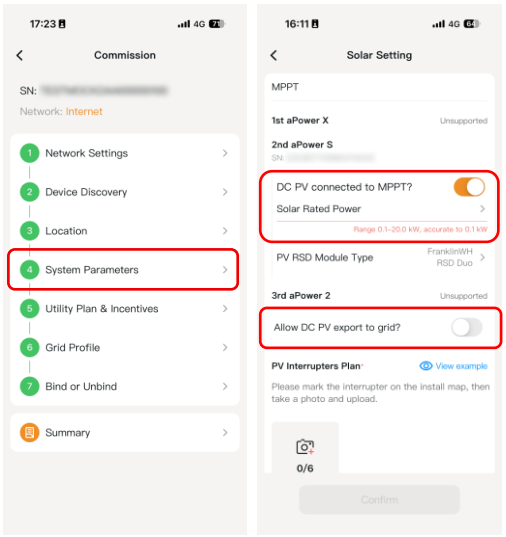
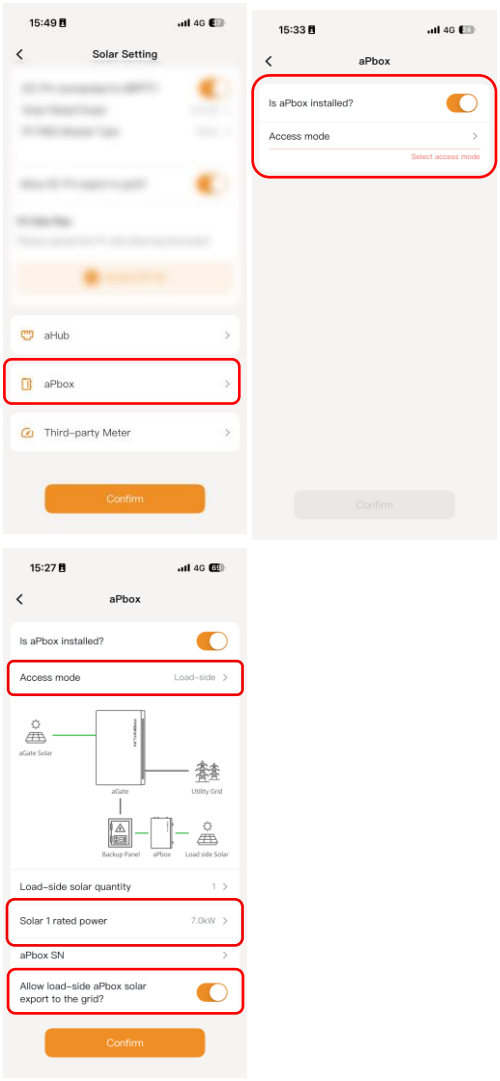
The commissioning steps are described below:

<table>
<tr><th>New PV</th><th>Existing PV</th></tr>
<tr>
<td>
1. Login to the FranklinWH App with the installer account.
2. Tap System Parameters > Solar Setting to configure the new PV settings.
a. Enable the DC PV connected to MPPT toggle.
b. Set the solar rated power.
c. Disable the Allow DC PV export to the grid toggle.


</td>
<td>
3. Tap the aPbox bar to configure the existing PV settings.
a. Enable the Is aPbox installed toggle.
b. Select Load-side as the access mode.
c. Set the solar rated power.
d. Enable the Allow load-side aPbox solar export to the grid toggle.


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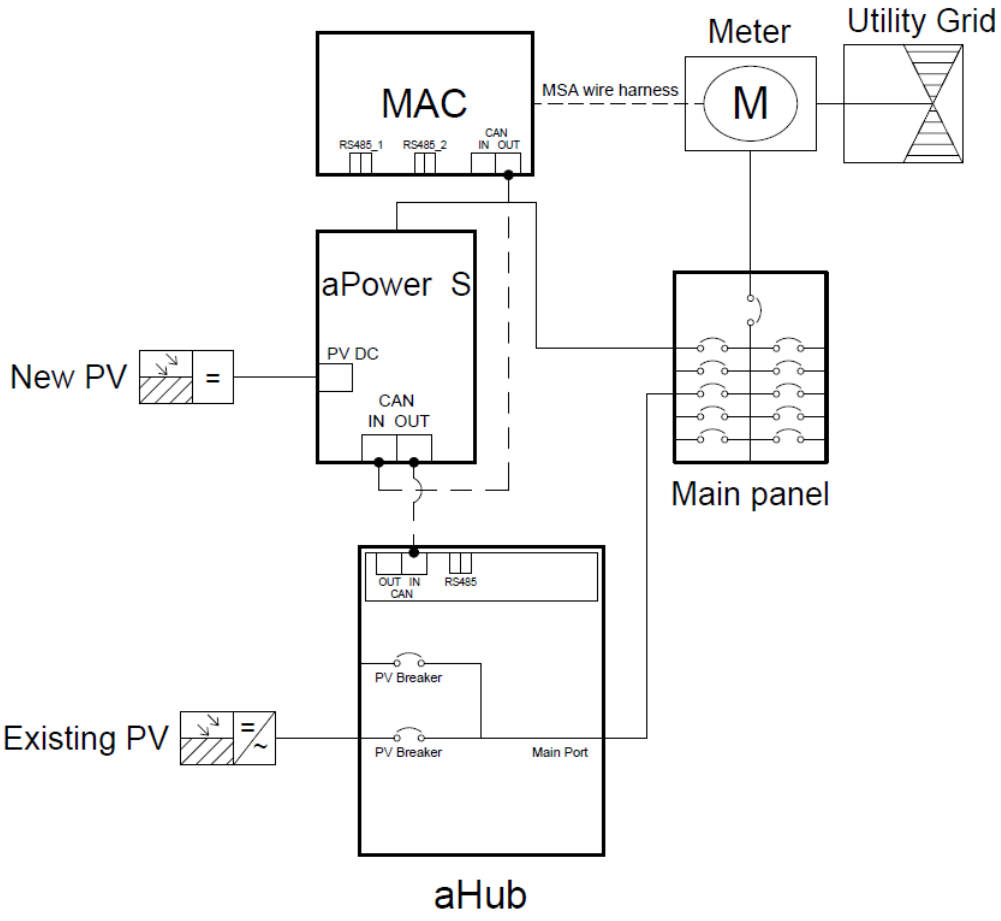
NEM-MT Configurations for MAC Systems

Scenario H: Existing PV via aHub and New PV DC via aPower S

The existing PV is connected to the aHub. The new PV DC is connected to the aPower S.

Note: *The total length of all CAN cables must be ≤ 164 ft (50 m) when devices communicate via CAN. For distances between 164 ft (50 m) and 328 ft (100 m), RS485 communications must be used.*



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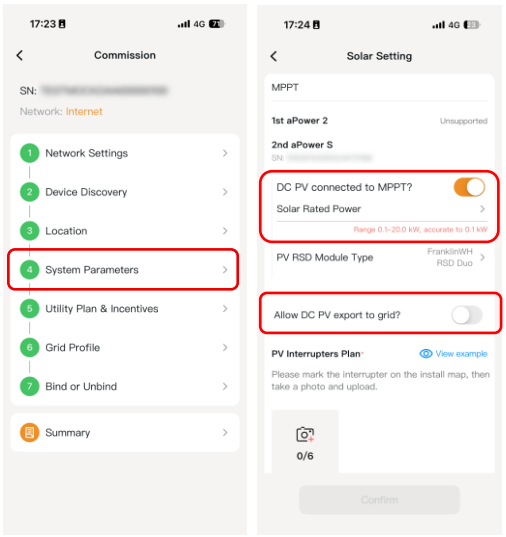
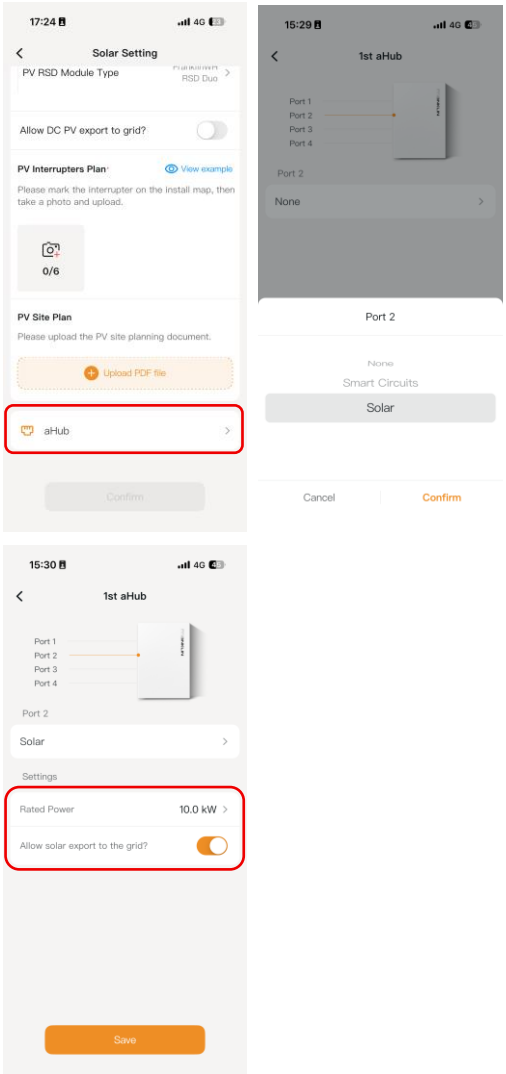
The commissioning steps are described below:

<table>
<tr><th>New PV</th><th>Existing PV</th></tr>
<tr>
<td>
1. Login to the FranklinWH App with the installer account.
2. Tap System Parameters > Solar Setting to configure the new PV settings.
a. Enable the DC PV connected to MPPT toggle.
b. Set the solar rated power.
c. Disable the Allow DC PV export to the grid toggle.


</td>
<td>
3. Tap the aHub bar to configure the existing PV settings.
a. Configure Port 2 as the Solar.
b. Set the solar rated power.
c. Enable the Allow solar export to the grid toggle.
Note:
aHub Ports 2–4 can be configured as Solar. Port 2 is used as an example.


</td>
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</table>

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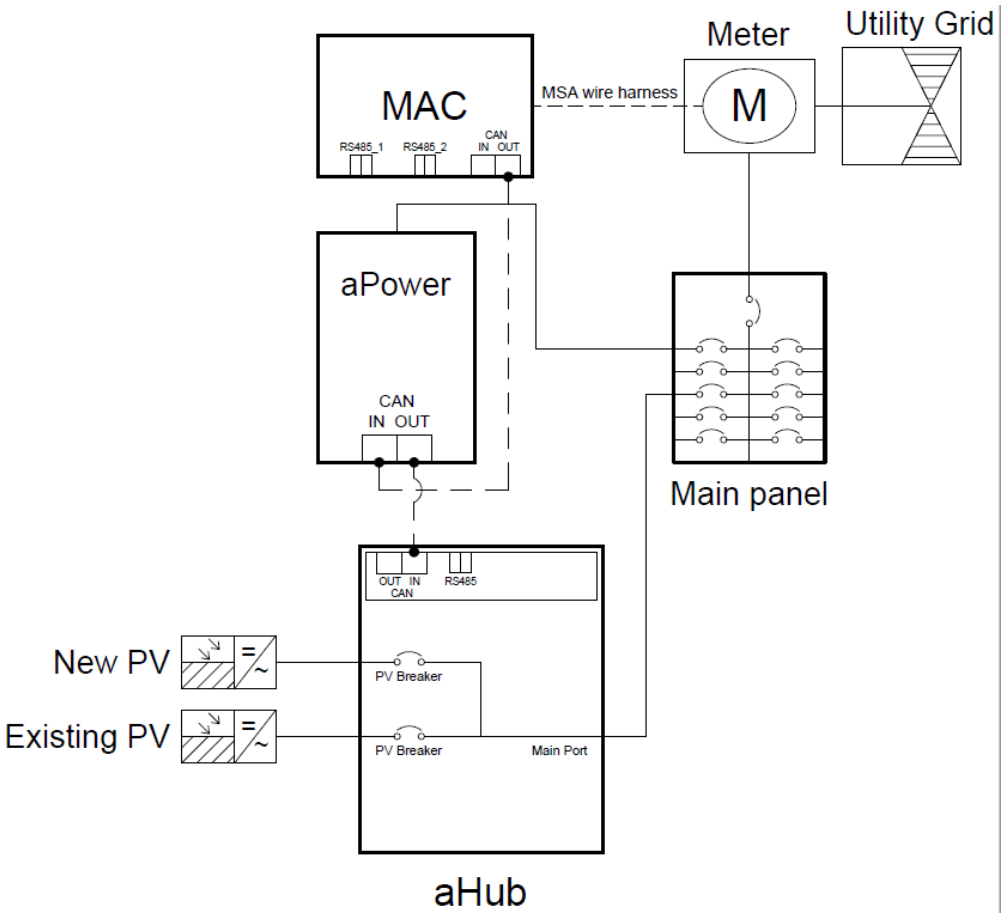
Scenario I: Existing PV and New PV on Separate aHub PV Ports

The existing PV is connected to the aHub. The new PV is connected to another PV port on the aHub.

Note: *The total length of all CAN cables must be ≤ 164 ft (50 m) when devices communicate via CAN. For distances between 164 ft (50 m) and 328 ft (100 m), RS485 communications must be used.*



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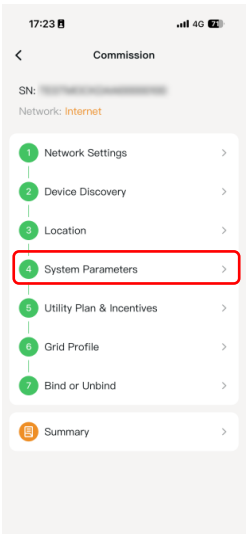
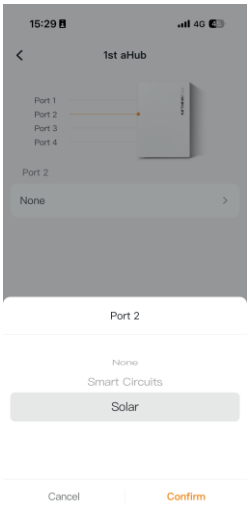
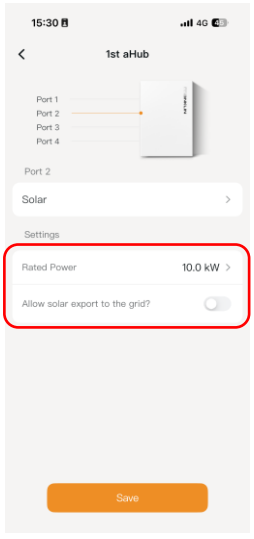
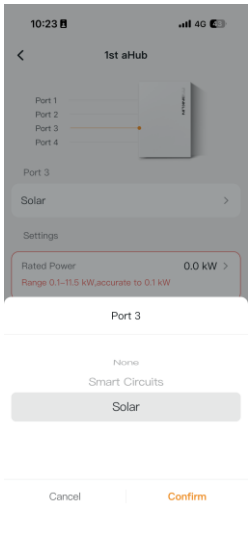
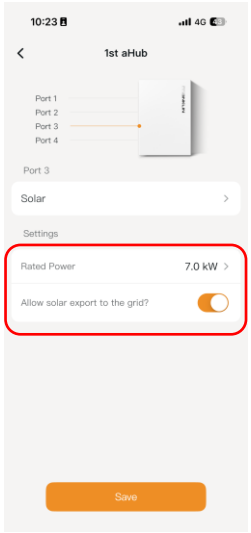
The commissioning steps are described below:

New PV	Existing PV
1. Login to the FranklinWH App with the installer account. 2. Tap **System Parameters** > **Solar Setting** > **aHub** to configure the new PV settings. a. Configure Port 2 as the **Solar**. b. Set the solar rated power. c. Disable the **Allow solar export to the grid** toggle.   	3. Tap **Port 3** to configure the existing PV settings. a. Configure Port 3 as the **Solar**. b. Set the solar rated power. c. Enable the **Allow solar export to the grid** toggle. ***Note:*** *aHub Ports 2–4 can be configured as Solar. Ports 2-3 are used as examples.*  

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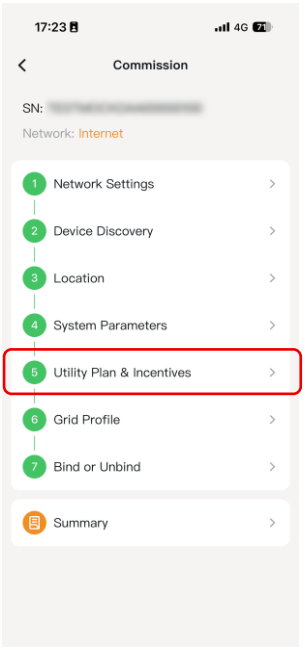
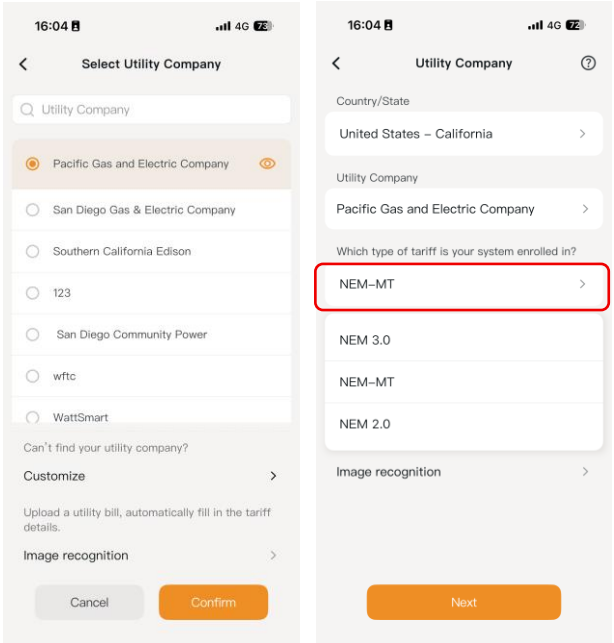
Tariff Settings

To get started, follow these steps:

1. Tap **Utility Plan & Incentives** to configure the tariff settings.



2. Select the utility company, and then tap **Confirm**.
3. Select **NEM-MT** as the tariff. It applies to utility customers in the territories of California's three major investor-owned utilities (IOUs): Pacific Gas & Electric (PG&E), Southern California Edison (SCE), and San Diego Gas & Electric (SDG&E).



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