

FranklinWH NEM-MT System Commissioning Guide

Background

Customers with existing Net Metered (NEM) PV systems who have additional load demand, and 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. Additional load demand may motivate consumers to add PV to existing export-allowed NEM PV to most efficiently offset utility energy cost. This document describes the need, the solution, and the commissioning process for such additions.

Most often, NEM-Multiple Tariff (NEM-MT) systems are appropriate for a home with an existing solar photovoltaic (PV) system which has experienced load growth since the original installation of the existing PV system. The existing PV system is likely still under a NEM-1 or NEM-2 contract, and adding a new PV system would otherwise mandate an NBT (NEM-3) contract for the entire system, which may negate the added value of new PV generation. This load growth may be driven by, but is not limited to, heat pumps, electric appliances or the purchase of an EV. Homeowners may become motivated to revisit their installed PV capacity for additional economic and resiliency benefits. Under NEM-MT, the home may have multiple types of PV subsystems, including both a NEM system (under the legacy/existing agreement) and new non-exporting PV system. This allows the consumer to avoid the economic losses of trading NEM value for NBT program/rates. This guide helps the system installation user properly commission the NEM-MT system.

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 loads power 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 is a simple concept which 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, actively measures and monitors the difference between PV production and load demand and issues continuous charge or discharge commands to the ESS/PCS to maintain a *zero-export* condition at a defined point in the system. NEM-MT Option 3 in California defines the point of connection at the feeder circuit on the load side of the PCS, as configured in **Diagram 1** below.
3. When adding a non-exporting PV & ESS system to an existing NEM system, with the existing NEM PV upstream (line side) of the aGate’s MID, the certified EMS and PCS components of

the new system will independently measure the legacy NEM PV system production with a dedicated current transformer (CT1) as well as the current flow at the point of interconnection of the new non-exporting PV & ESS

4. 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.

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 new home load: The system will use the power of the new PV to supply the new load and the remaining new load will be supported by the aPower discharge. The order of new 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 the new home load AND new PV output is less than the aPower charge rate: the system will first use the power of the new PV to supply the new load, and the remaining new PV output will charge the battery. The existing PV output will export to the grid.
3. When new PV output exceeds the combined new home load and aPower charge rating, the new PV output will be disconnected via the FranklinWH relay to prevent export of the new PV to the grid.
 - a. While new PV is curtailed, aPower will discharge to serve loads up to its power rating, then NEM PV will offset loads, then 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 aPower: the home loads will consume output from the existing NEM PV.

Installing FranklinWH and additional solar panels to an existing NEM solar system on the line side of the main panel

When installing a NEM-MT FranklinWH system and additional solar panels at a site with an existing NEM system interconnected on the line-side of the main panel, follow these configuration instructions.

Follow the system installation recommendations provided in the ***FranklinWH System Installation Guide***.

Connect the new solar output into the aGate PV breaker and connect the main backup panel into the aGate backup port. This new solar system is under the Net Billing Tariff contract. The existing solar system is under the existing Net Metering contract.

Measurement using CT's

If the cable length between the existing NEM Solar and the aGate is less than 130 ft (40 m), only an external CT installation is needed and CT1 must be used to measure NEM PV, See **Split CT Installation Guide** for more general CT installation information.

Diagram 1 provides an example of system layout and metering.

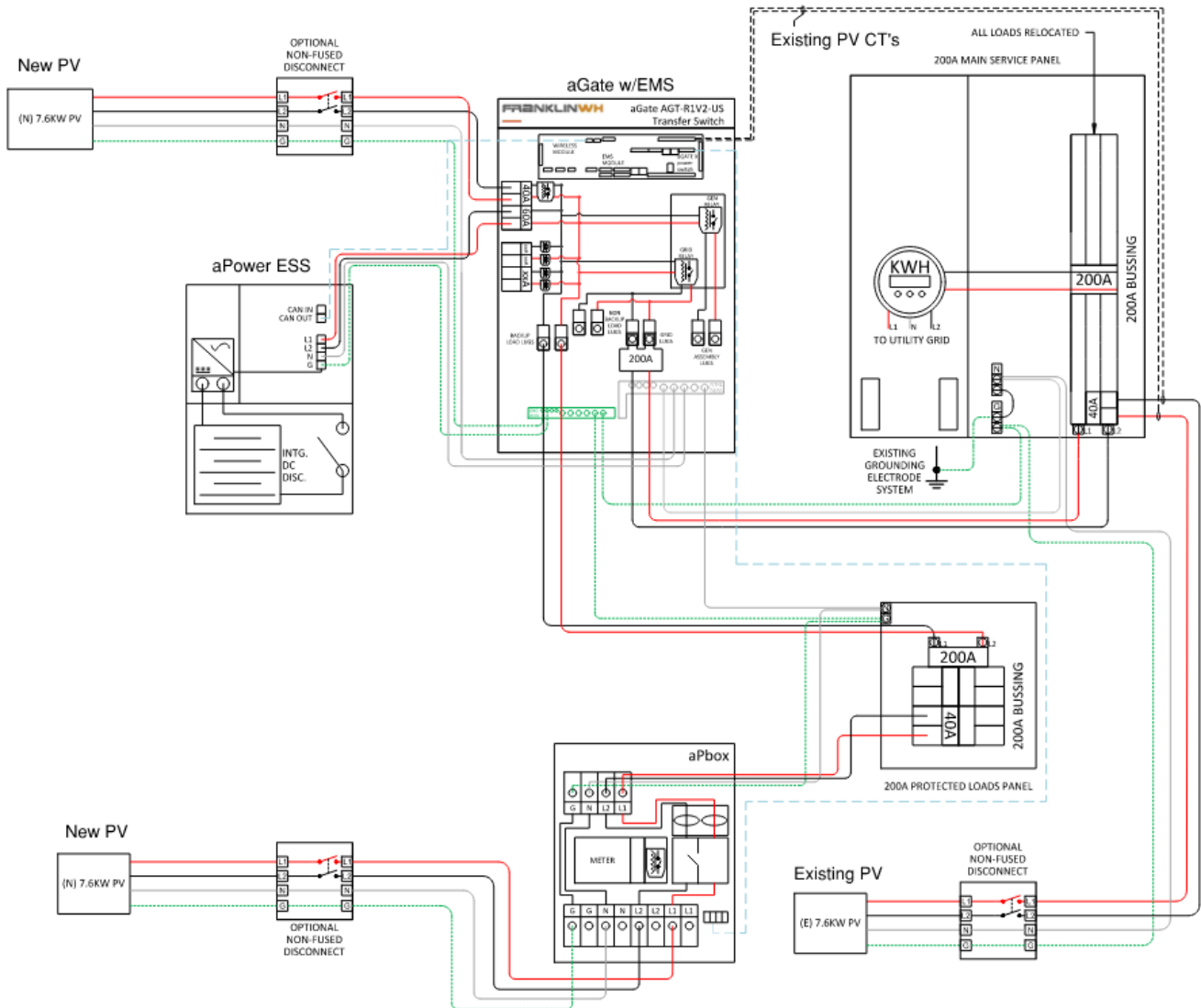
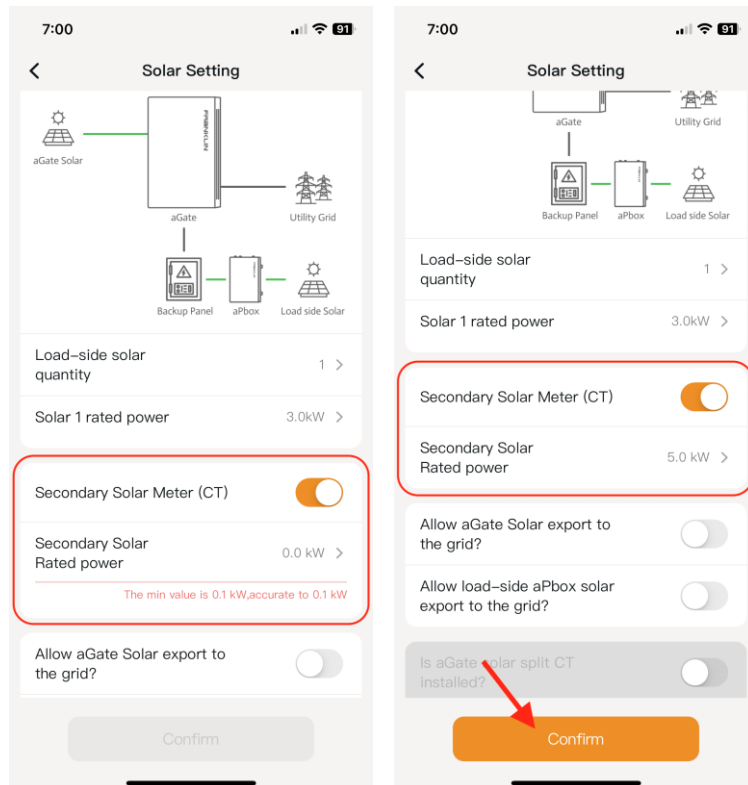
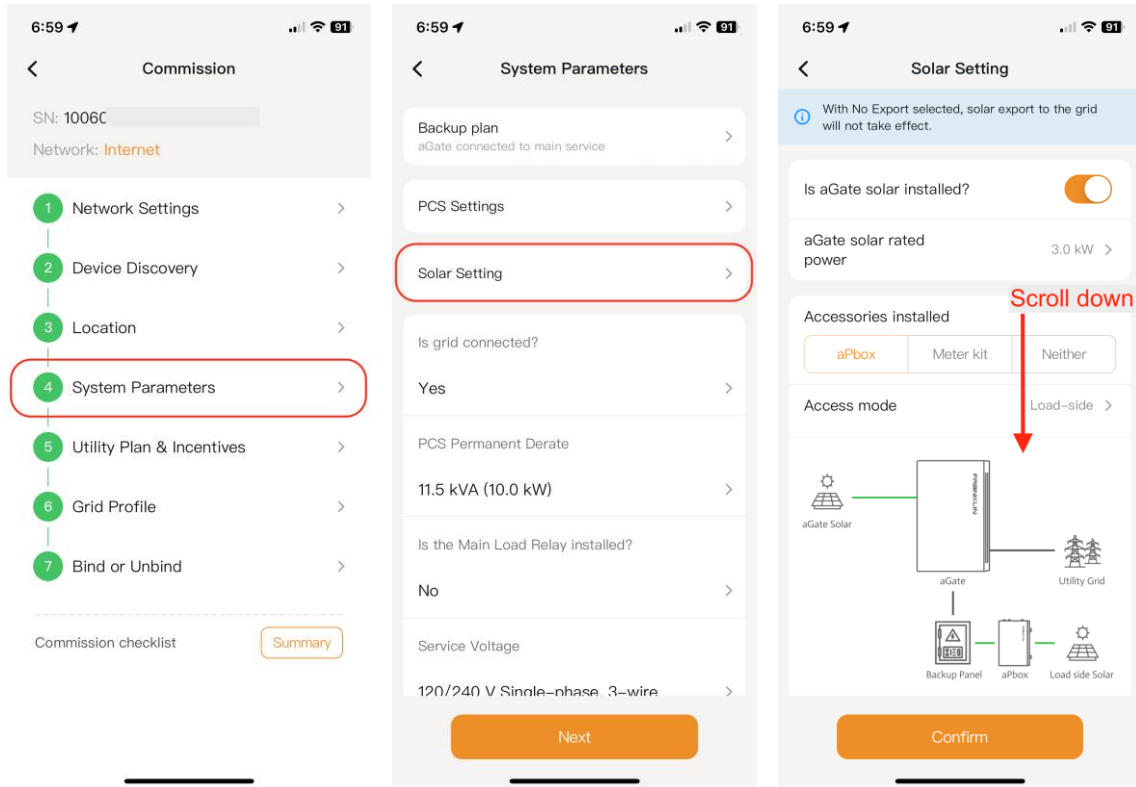


Diagram 1: NEM-MT Option 3 – Line Side connected existing PV with CT measurement

Installing an external CT: Set the status of the Secondary Solar Meter (CT1) to Enable and set the Secondary Solar Rated AC Power (kW) (optional).



Measurement using an aPbox

If the cable length between the existing NEM solar installation and the aGate is greater than 130 ft (40 m), an external aPbox installation is required, See ***aPbox Installation and Operations Manual*** for more information.

The following **Diagram 2** provides an example of system layout and metering.

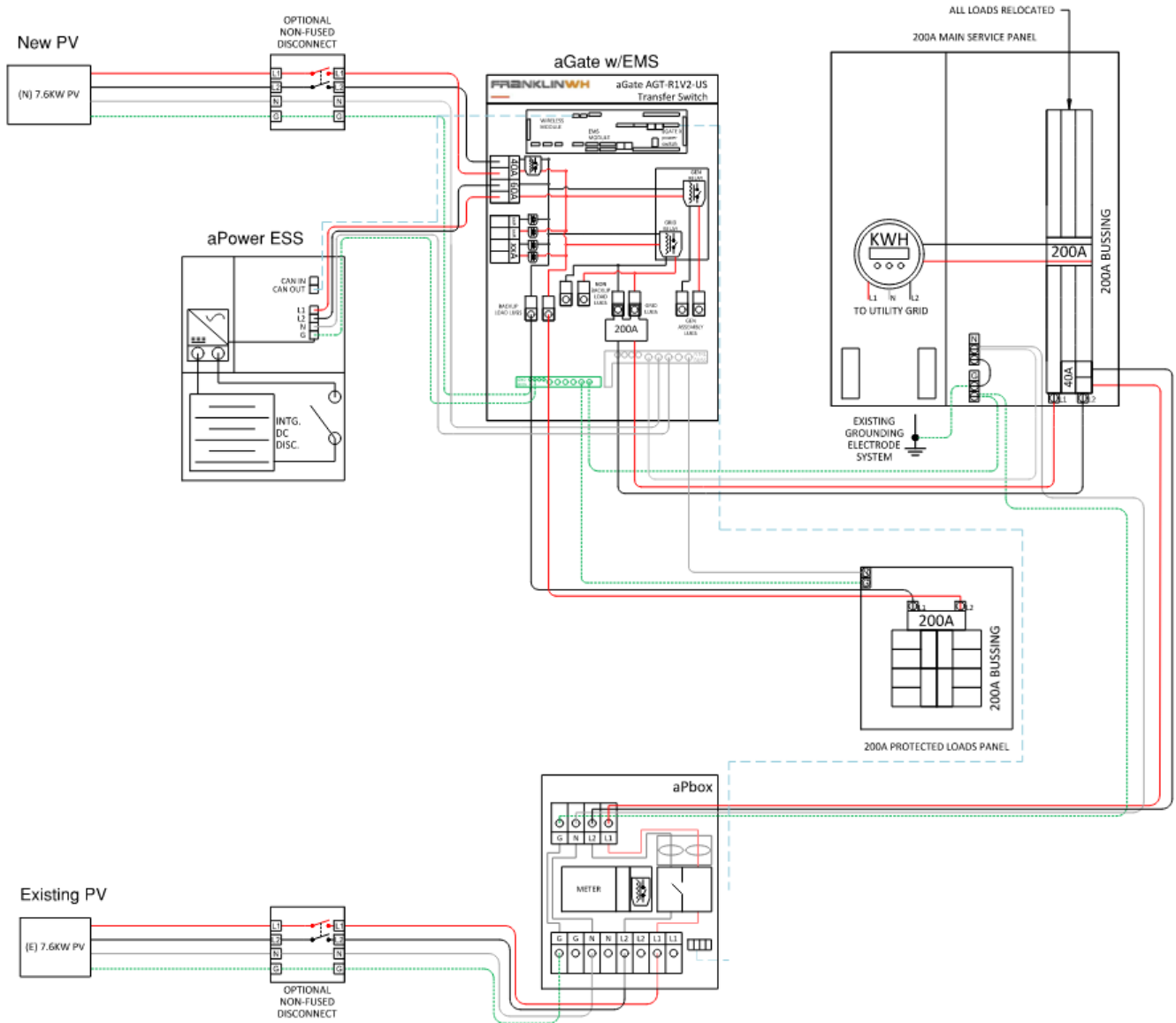
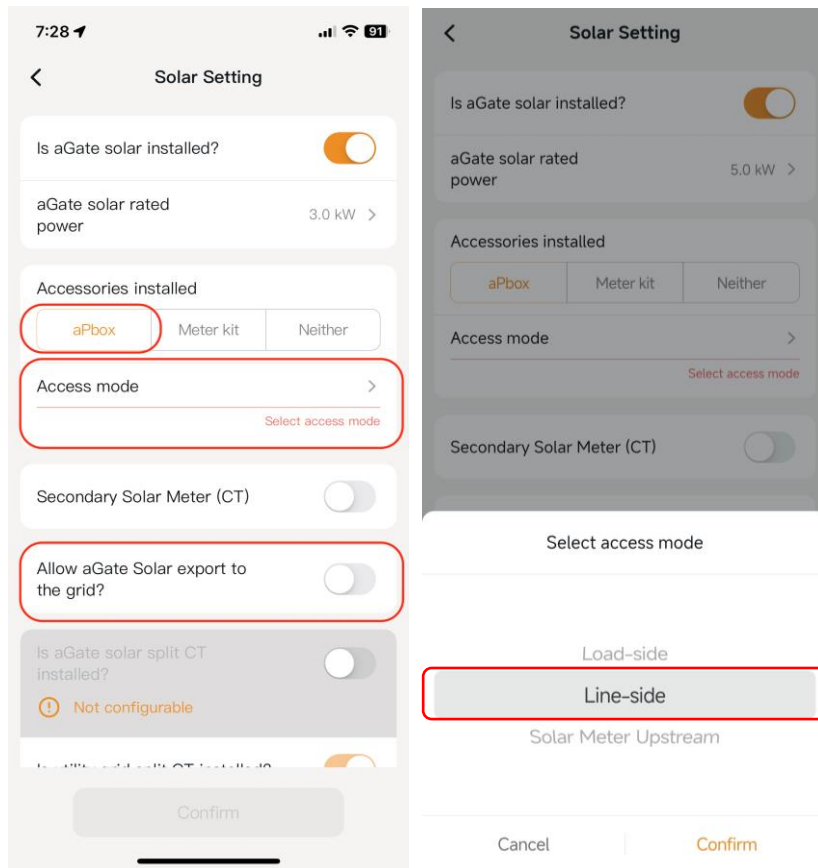
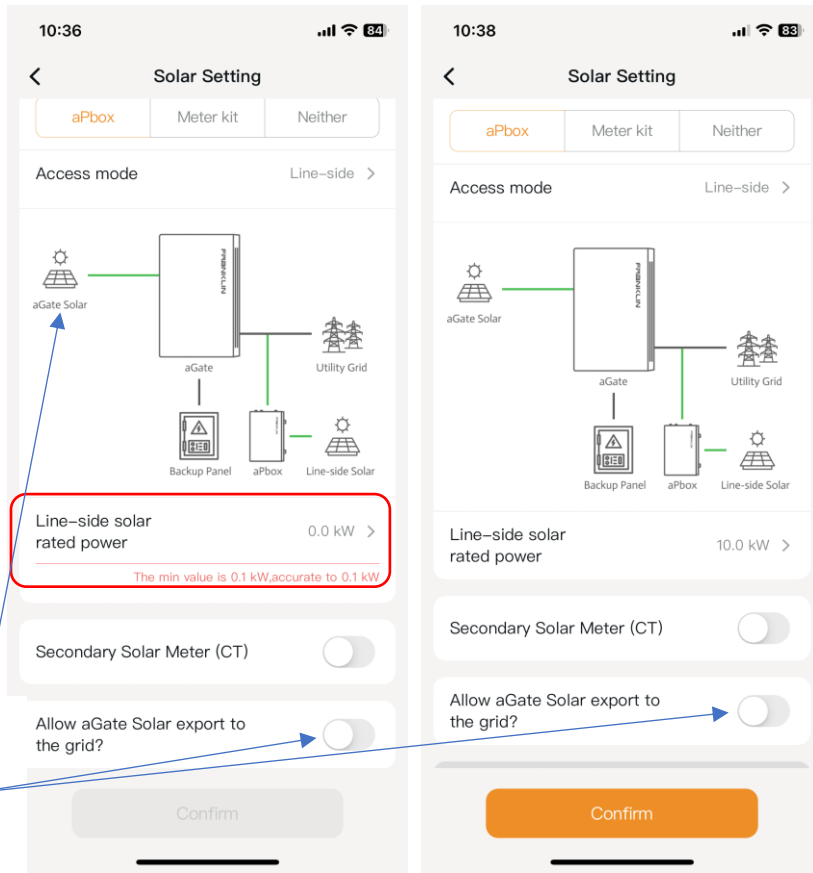


Diagram 2: NEM-MT Option 3 – Line Side connected existing PV with aPbox measurement

Select aPbox and set Line-side as the access mode during commissioning Solar Setting tab.



Finally, set the value for the Line-side solar rated power and confirm.



Commissioning is now complete.