FRANKLINWH

Split CT Installation Guide

aGate X 1.3, SKU: AGT-R1V2-US

Split CT Kit, SKU: ACCY-CT200V2-US

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Overview

In some setups, solar panels or sub-panels with loads are connected in a way where the CTs inside the aGate are not able to correctly measure the electricity flow.

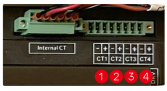
The FranklinWH system uses a set of CTs to include that part of measurement into the energy calculation of the aGate, showing users real-time energy production and consumption in a more precise way. The user will then be able to base their energy usage decisions on the remaining backup hour and other factors measured by the CTs.

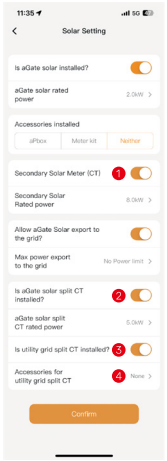
NOTE

1. Only FranklinWH accessories are compatible. Do not attempt to use third-party meter accessories or those from other brands, as they are not supported and may result in system issues.

2. CTs leads should not exceed 50 ft (15 m).

The aGate EMS module includes three internal CT ports and four optional external CT ports.





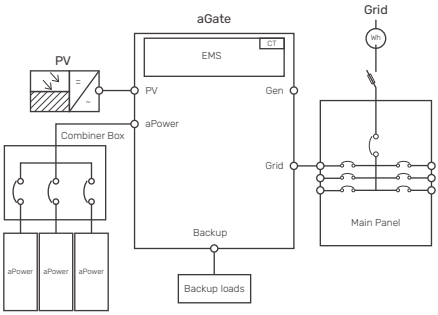
External CT Ports	Function	Limitation
1 CT1	Isolated PV Metering – Not Combined with Other PV Sources. The readings will be displayed separately in the FranklinWH App.	• CT1 must be installed on the L2 line of the PV output. • It is programmed exclusively for NEM PV and applies only to HI NEM+ and CA NEM-MT. • This PV system does not charge the battery.
2 CT2	Combined PV Measurement – aggregated within aGate. The measurements from CT2 will be combined with the PV readings inside the aGate system.	• CT2 must be installed on the PV output L2 line. • The control logic for PV measured by the external CT2 is the same as that for aGate PV. • The CT2 use case is not affected by whether the customer is in Self-Consumption or TOU mode.
3 4 CT3-CT4 Pair	Dedicated grid consumption measurement for lineside non-backup loads. CT3 and CT4 measurements will be integrated with grid consumption readings within the aGate system.	CT3 and CT4 are designed exclusively for grid consumption measurement and cannot be used for PV measurement.

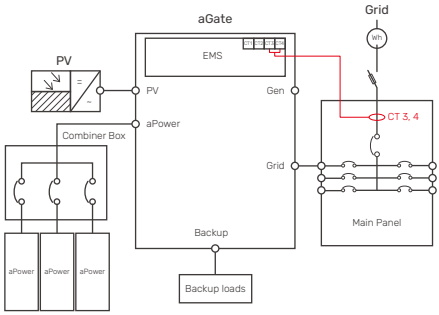
Typical Grid Consumption & PV Production Metering

Grid Consumption Metering

- Upstream Grid Consumption Metering

  Scenario: The aGate is connected to the grid via the main panel, and non-backup loads are connected to the grid via the same main panel. The preassembled CTs do not measure the current from the non-backup loads, and the aGate needs that information for its whole-house consumption calculation.

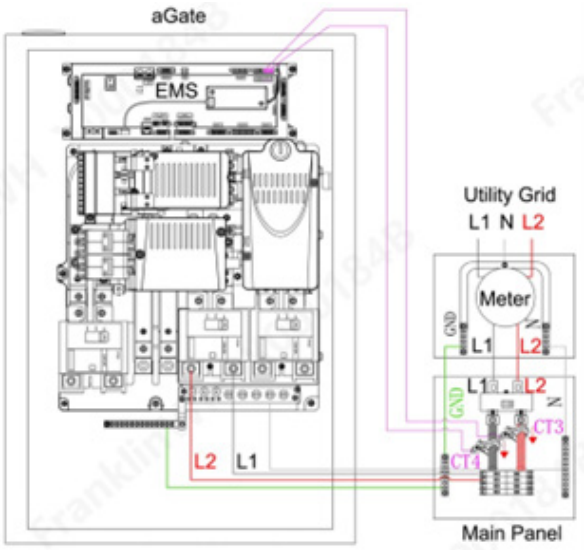




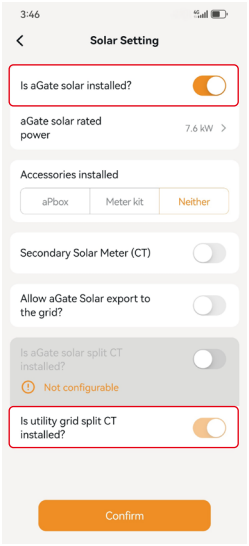
Recommendation: On the upper end of the service wire that connects the main panel with the utility grid, install a pair of CTs (CT3/CT4) with their ends connected to the CT3 and the CT4 ports of the EMS module inside the aGate. These additional CTs will enable the aGate to include the consumption from the external non-backup loads into its calculation for the whole-house energy usage.

In this case, the preassembled grid CT must be disconnected from the aGate. Refer to Preassembled Grid CT Removal for detailed instructions.

Installing a grid breaker in the aGate will switch the positions of the L1 and L2 connections. Without the grid breaker, the L1 is connected to the port on the left and the L2 is on the right. After adding the grid breaker, the L1 will be on the right and the L2 will be on the left.



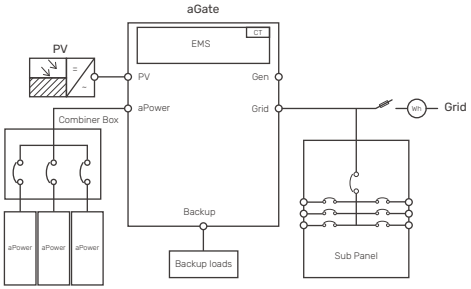
CT3 / CT4

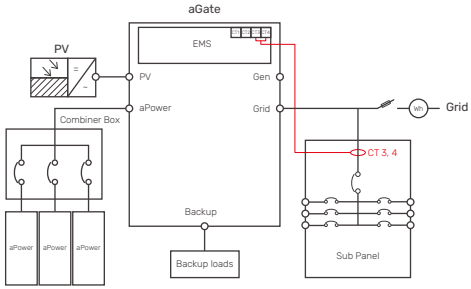


- Parallel Consumption Metering

  Scenario: The wiring of non-backup loads is combined into a subpanel. The subpanel is connected to the grid without passing its wires through the aGate.

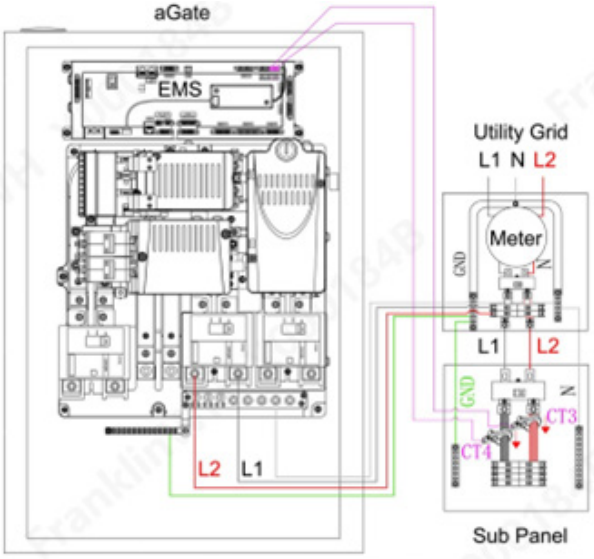
  In this case, the aGate does not detect or monitor the power consumption from the non-backup loads, and it cannot calculate the total energy usage of the entire house.



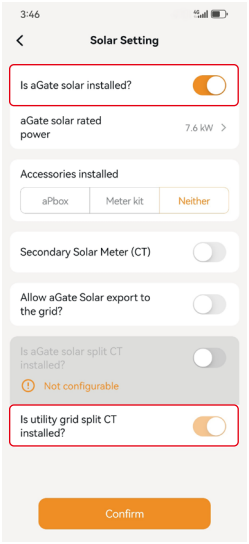


Recommendation: On the upper end of the wire that connects the subpanel with the grid, install a pair of CTs (CT3/CT4) with their ends connected to the CT3 and the CT4 ports of the EMS module inside the aGate. In this way, the aGate measures the consumption of the non-backup loads even if their wires are external.

The aGate will calculate the energy consumption of the non-backup loads from the subpanel.



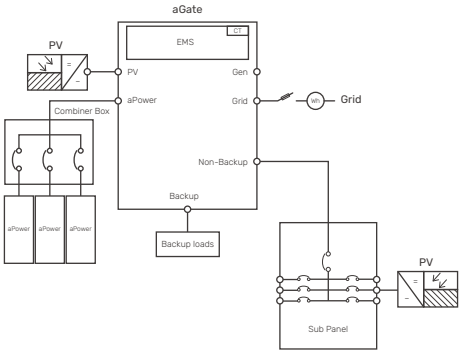
CT3 / CT4

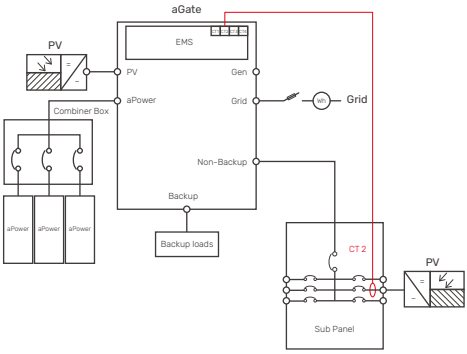


PV production Metering

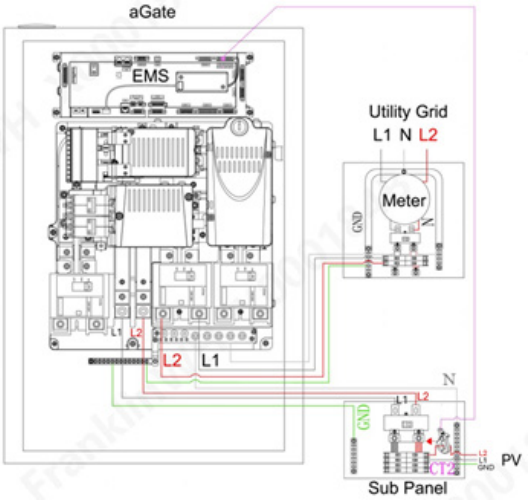
- A Split PV System Connected to the aGate Non-backup Panel

  Scenario: When a split PV system is connected to the non-backup port of the aGate via a subpanel, the aGate cannot measure the production from that split PV system.





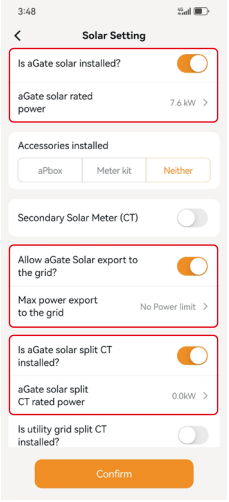
Recommendation: Install another CT (CT2) on the L2 of the subpanel to measure the output of the separate PV system. The CT terminal is then connected to the CT2 port of the EMS module inside the aGate. The aGate now includes the external PV production into its energy calculation, measuring the production from both the CT and the PV which it is directly connected to.



Enable and set the power rating

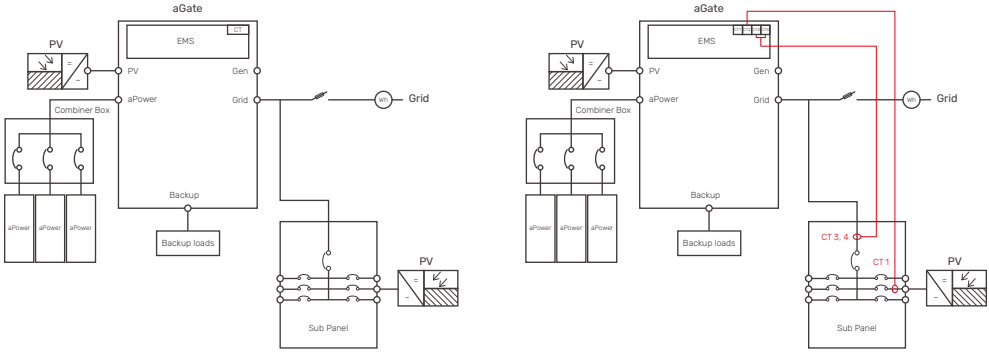
Enable and set the max power export to the grid

Enable the aGate to measure the power from the split PV



- A PV System Connected to the Line-side Subpanel

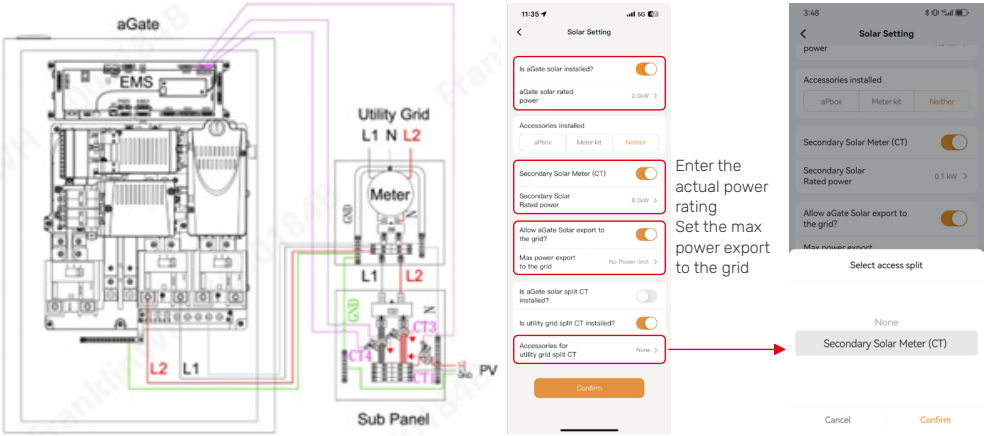
Scenario: A PV system is connected to the utility grid via a line-side subpanel. The wiring of non-backup loads is combined into the same subpanel external to the aGate. The aGate cannot monitor the production from that PV system, or the non-backup loads consumptions.



Recommendation: To accurately measure both the PV production and the consumption of non-backup loads, it is recommended to install another three CTs on the line-side subpanel:

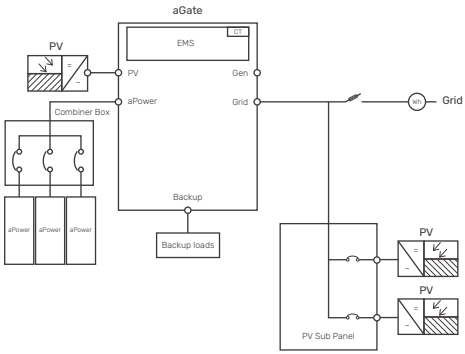
- On the L2 of the subpanel, install one CT (CT1) with its terminal connected to the CT1 port of the EMS module inside the aGate. The aGate then measures the production from the existing PV, and separately displays the measurement on the FranklinWH App. Notice that the PV measurement is for the displaying purpose only; the aGate will exclude this part of measurement from its total PV input calculation.

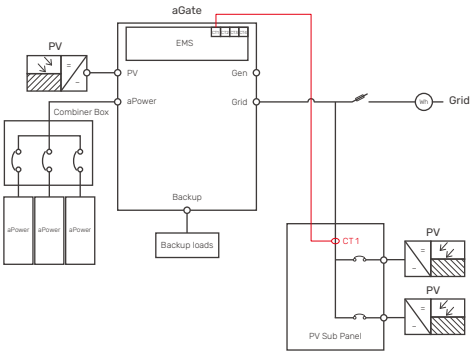
- On the upper end of the wire that connects the same subpanel to the utility grid, install two more CTs (CT3/CT4) with their ends connected to the CT3/CT4 ports of the EMS module inside the aGate. This enables the aGate to measure and include the consumption of non-backup loads in its total energy consumption calculation.



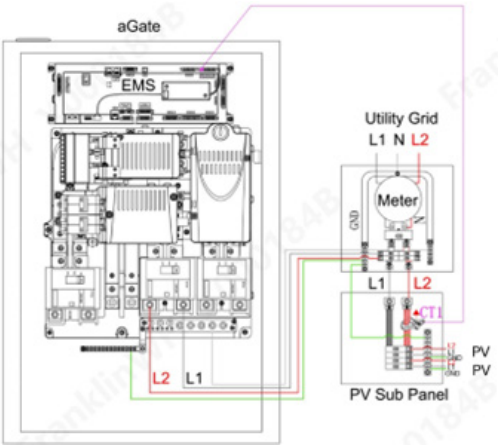
- PV Systems Directly Connected to the Grid

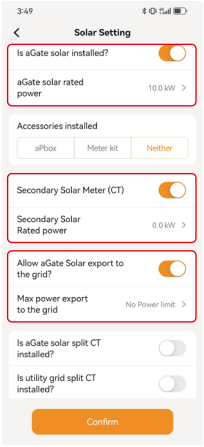
Scenario: Multiple PV systems are directly connected to the utility grid via a subpanel. The aGate is unable to monitor the production from these PV systems.





Recommendation: Install a CT (CT1) on the L2 line on the PV subpanel, with the CT terminal connected to the CT1 port on the aGate EMS module. The aGate will measure the production from the PVs. The PV production will be separately displayed on the FranklinWH App.





Enable and set the power output

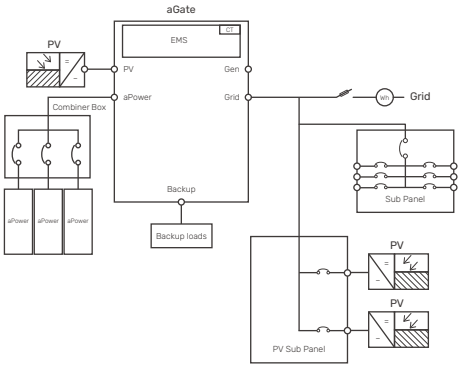
Enter the actual power rating

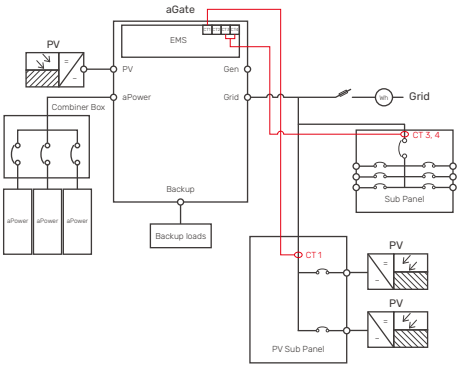
Set the max power export to the grid

- **PV Systems and a Subpanel Directly Connected to the Grid**

Scenario: Non-backup loads are connected to the utility grid through a subpanel, and PV systems are connected to the utility grid through a separate PV subpanel. Both the non-backup loads and the PV systems are tied to the utility grid.

In this scenario, the aGate is unable to measure either the production from the PV systems or the consumption from the non-backup loads.

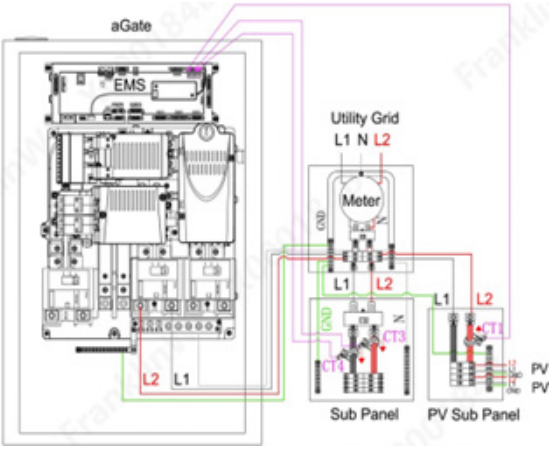


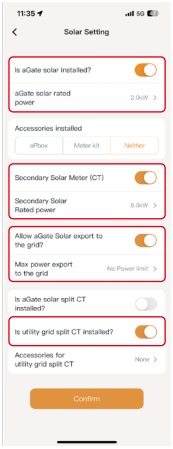


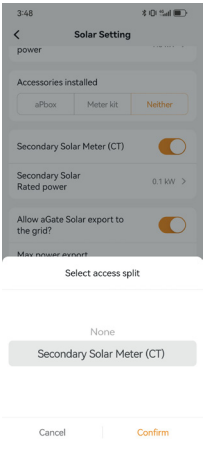
Recommendation:

- On the upper end of the wire that connects the PV subpanel to the utility grid, install a CT (CT1) with its end connected to the CT1 port on the EMS module. The aGate will be able to measure the production from the PV systems, and the data will be separately displayed on the FranklinWH App.

- On the upper end of the wire of the subpanel with loads, install two CTs (CT3/CT4) with their ends connected to the CT3/CT4 ports on the EMS module. This measures the consumption from the non-backup loads external to the aGate, and the measurements will be counted as a part of the total energy consumption by the aGate.







Notice: Add an aPbox for PV metering if the CT location is at a greater distance than standard CT extension wiring specification allows, please refer to the aPbox installation guide.

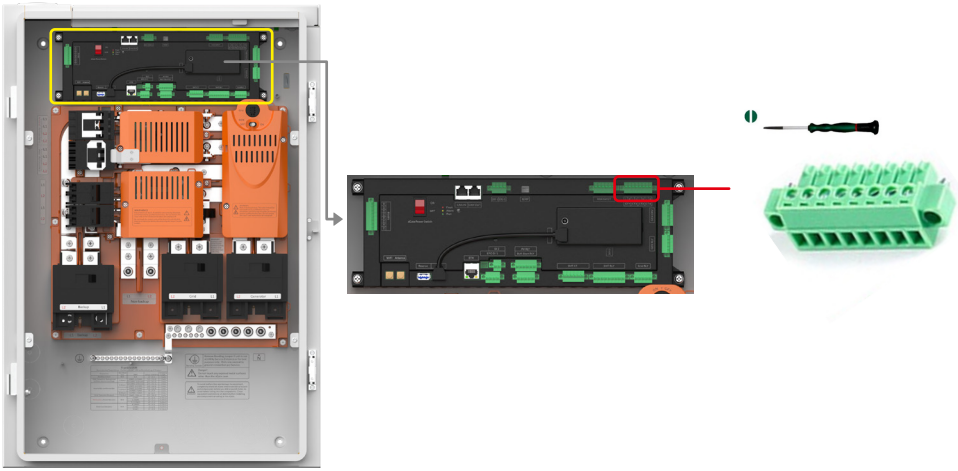
CT Installation

> ⚠ **WARNING**
>
> 1. Ensure that CT's clamp joint is in tight contact for measurement accuracy.
> 2. Ensure that CTs are installed and wired correctly with correct polarities.

Please refer to the following steps to install additional CTs.

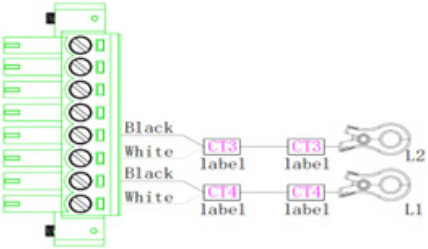
Step 1. Power down the system, turn off and lock the upstream and downstream circuit breakers. Wait at least 5 minutes before the installation.

Step 2. The EMS module is inside the aGate with a terminal block preassembled near its top right corner. Remove the terminal block using a 2 mm screwdriver on both ends.



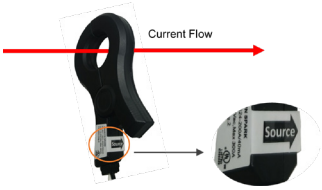
Step 3. Strip the CTs wires with a stripping length of 0.32 in (8 mm).

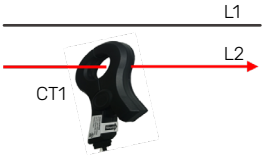
Step 4. Label both ends of each CT wire (CT1, CT2, CT3, CT4), using CT3/CT4 as an example.



Step 5. Connect the CT wires to their corresponding ports on the connector of the EMS module.

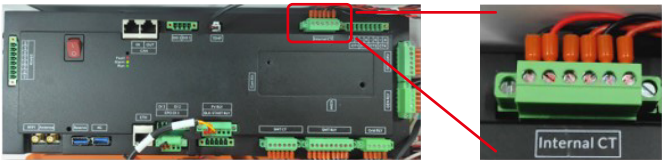
Step 6. Pass the L1 wire and the L2 wire through the CTs respectively, in the same direction as the arrow labelled on each CT, as shown in the following table.



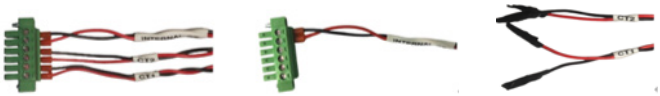
CT Number	CT Install Direction
CT1	From PV  To sub-panel / grid
CT2	From PV  To sub-panel
CT3/CT4	From Grid  To sub-panel

Preassembled Grid CT Removal

1. Refer to the picture below to locate the internal CTs terminal on the EMS.



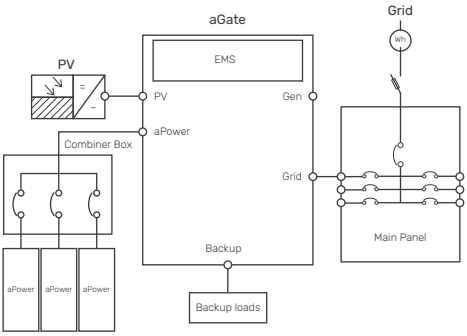
2. Remove the internal CT connector from the EMS. Then disconnect the preassembled grid CT wires that are labelled as CT1 and CT2. Securely insulate these wires by wrapping at least three layers of electrical tape near the ends.



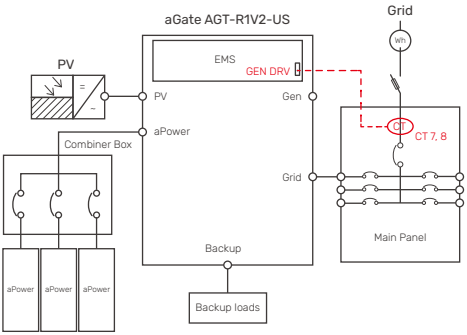
3. Re-connect the terminal to its original position on the EMS. Then make the cabling neat and tidy.

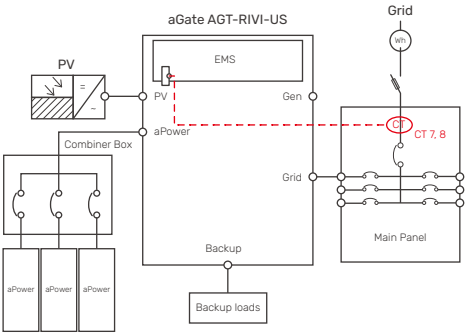
Main Panel Consumption Metering with Power Control

Scenario: In a partial backup scenario, as shown in the figure below, the aGate cannot monitor the power consumption of non-backup loads on the main panel. Power from the aGate to serve loads in this panel is limited by the aGate grid breaker and PCS controls are used to ensure the grid breaker does not trip. Additional load requirements can only be served by the grid.

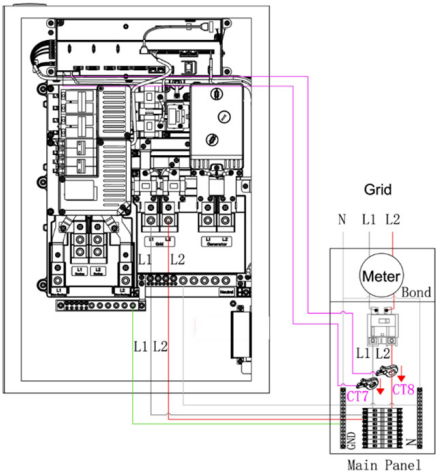


Recommendation: Install two CTs on the upstream main breaker of the Main Panel, then connect the CT terminal to the **"Gen DRV" port (for aGate 1.3)** OR the **"Gen CT" port (for aGate 1.1)** on the aGate.
The output from these CTs is measured and sent to the aGate. The aGate then uses power control logic to manage the current flowing through the breaker that feeds the aGate from the main panel, as well as the current through the main breaker, preventing them from tripping.

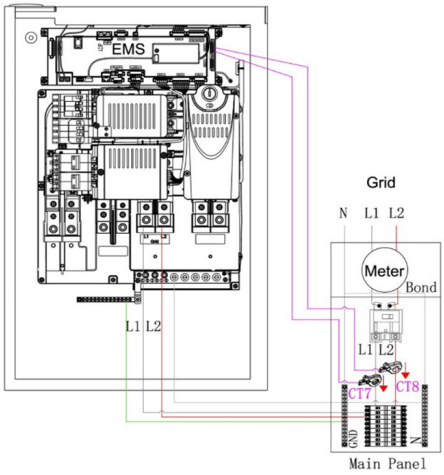




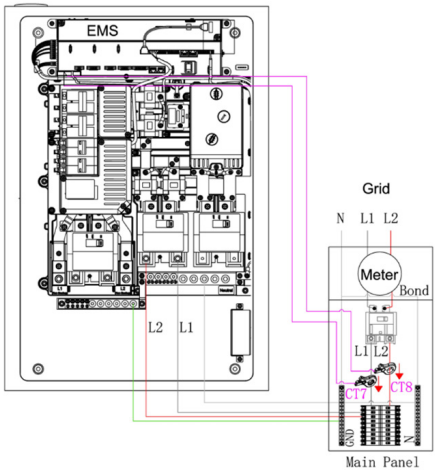
NOTE: For partial home backup with peak main load panel demand exceeding circuit breaker rating from aGate to main panel, PCS conductor limiting can be used to limit backfeed current from aGate using the Generator CTs in addition to aGate grid CTs. This will preclude use of the generator kit, which is normally used in conjunction with larger whole-home backup systems.



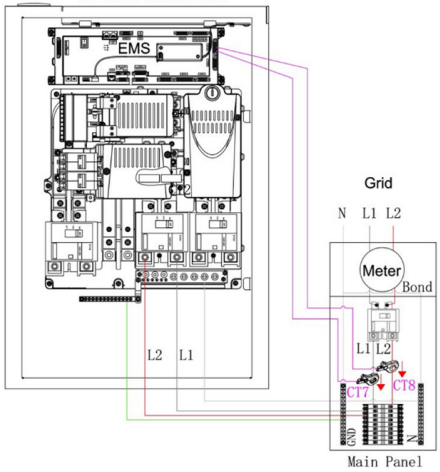
aGate 1.1 without Breaker



aGate 1.3 without Breaker



aGate 1.1 without Breaker



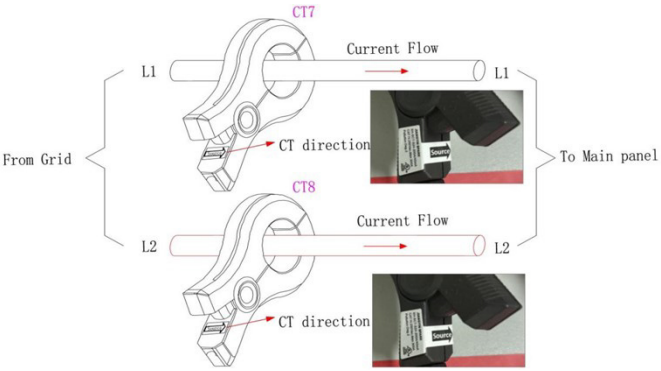
aGate 1.3 without Breaker

CT Installation (Main Panel Consumption Metering with Power Control)

NOTE: Power down the system with the upstream and downstream circuit breakers turned off and locked. Wait at least 5 minutes before performing work.

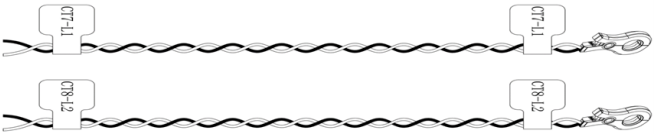
Step 1. CT Installation

Make sure the clamping direction is correct. The direction of the CT is on the inner side of the handle.



Step 2. Making CT Cable Terminals

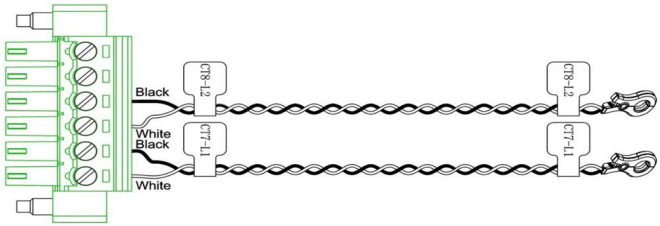
(1) Add labels to both ends of the CT cables. Labels can be found in the packaging box.



(2) Connect the CT cable to the aGate and connect CT7 & CT8 to the corresponding terminals according to the following picture. Terminals can be found in the packaging box. Select the terminals according to the aGate versions.

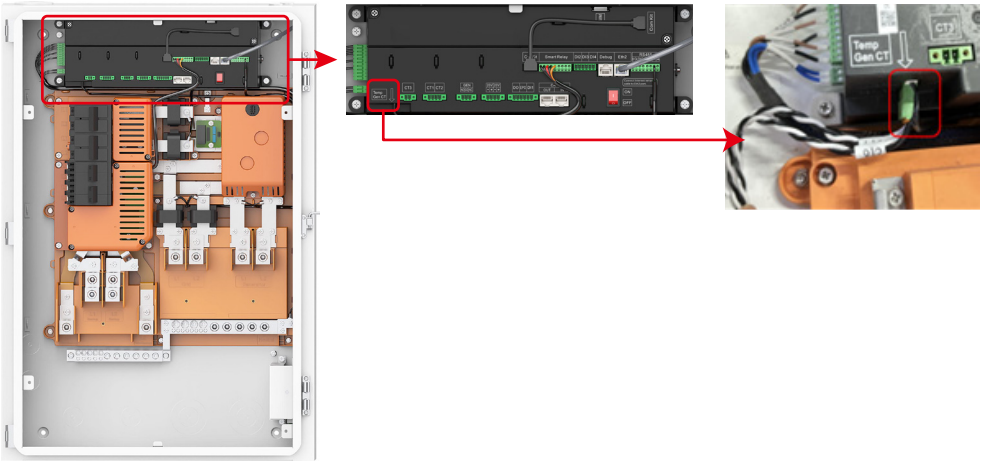
aGate 1.1: Strip 0.4 in (10 mm) of insulation from each CT cable.

aGate 1.3: Strip 0.32 in (8 mm) of insulation from each CT cable.

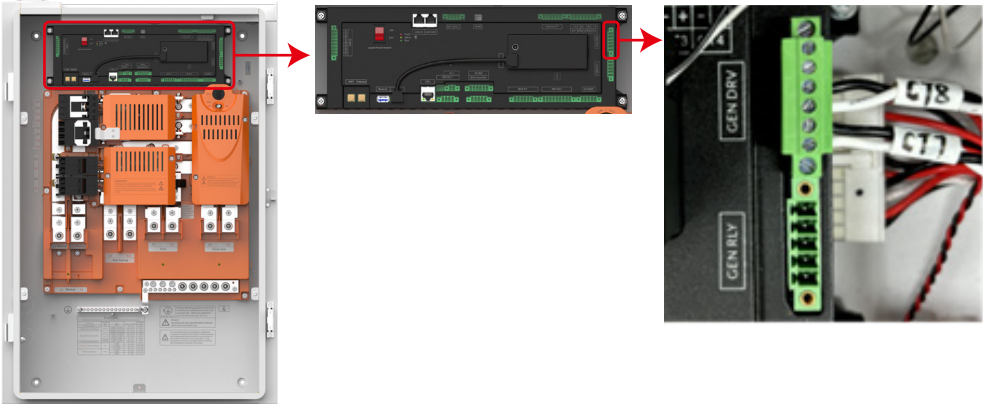


Step 3. The CT Terminal Connects to the EMS

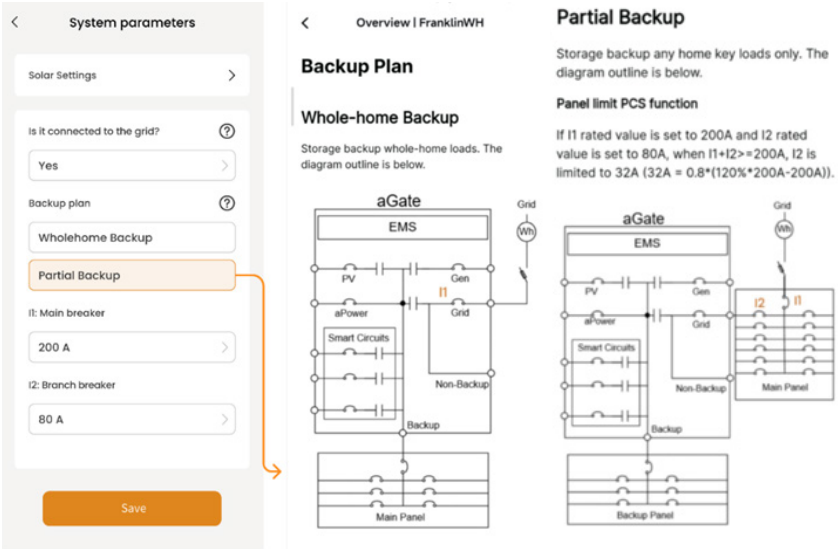
aGate 1.1: Connect the CT terminal to the “Gen CT” port on the EMS and secure the CT cable using a cable tie.



aGate 1.3: Connect the CT terminal to the “Gen DRV” port on the EMS and lock the terminal screws.



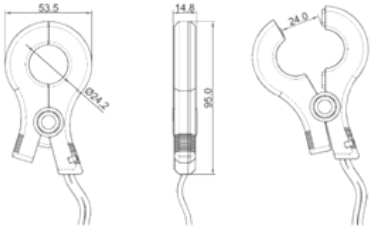
Step 4. App Parameter Settings



Appendix: CT Specifications

CT Appearance

CT specifications are shown in the table below.

Type	Specification	Mechanical Specification (mm)
Φ24	200 A / 40 mA	

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