How to recover aPower battery charge using generators

Overview

Franklin Home Power is a system (FHP) providing integration for third party generators through the built-in Generator Module, which is optional and can be easily installed without any external components. When the utility grid and solar are not available, during a prolonged outage or at night, the aPower battery charge may be depleted. In such events, a generator may serve as a backup power source for the household loads and to recharge the aPower battery. The addition of a generator to the FHP can provide uninterrupted power to homes during prolonged outages.

Key features of the FHP generator integration:

- Compatible with most models of standby generators.
- The generator can both power home loads and charge aPower batteries.
- The Auto-exercise function can maintain good generator performance.
- Customize generator operation based on homeowner preferences:

  - **Auto Mode**

    SOC Control: The generator will be automatically started when the FHP is working in off-grid mode and after battery SOC falls below the set level (20% default. Adjustable, 10-80%). The system will activate the generator to power the home, with the surplus power charging the aPower X batteries.

    When grid power resumes, morning comes and the solar array returns to producing energy, or the FHP battery level reaches the upper SOC (80% default. Adjustable, 20-100%), the generator will be automatically shut off and other sources will power the home loads.

    Charging Schedule: Based on their own habits, homeowners may set up a charging schedule through the FranklinWH App for the time periods when power supply from the grid is interrupted. The settings allow up to three non-overlapping time periods in a single calendar day. Once the charging schedule is enabled, when the generator is activated to power the loads, it also charges the batteries. When the charging periods ends, the generator is shut off.

  - **Manual Mode**

    When the power supply from the grid is interrupted, users may manually start/shutdown the generator. For example, when a power outage occurs, the user may start the generator when leaving the home, to charge the FHP system in advance, and may shut off the generator via the app before they return home, so that the FHP system will take over as the power source. This helps to manage the noise produced by the generator, so that customers may enjoy a quieter home environment.

Supported generator start-up types:

- Voltage sensing
- Two-wire
- ATS

NOTE: The FHP does not support 3-phase generators or 120V single-phase generators. Only 240V split-phase generators with a 4-wire connection (L1, L2, neutral and ground) are supported.
For standby generator connection and commissioning information, refer to *Franklin Home Power System Installation Guide* and *Franklin Home Power System Commissioning Guide*.

Note that only the portable generators listed in the table below are supported by FHP to date. If you have one of the supported generators, carefully follow the instructions outlined in this document. Using other generators may result in a failure to charge batteries and could damage the generator, home loads and the FHP equipment.

Make	Model	Nameplate	Outlet Type
Champion	9375	Starting Wattage: 9375W Running Wattage: 7500 W	Four 120V 20A GFCI outlets, 120/240V 30A locking outlet, 120/240V 50A outlet (14-50R)
Honda	EG5000 CL	Starting Wattage: 5000W Running Wattage: 4500W	Two Duplexes 120V 20A (5-20R) GFCI outlet 120V 30A (L5-30R) outlet, 120/240V 30A (L14-30R) outlet

Note:

1. Users are required to confirm that they have purchased and installed the FranklinWH Generator Module before connecting a generator.
2. If aPower recovery failed, turn off the large loads, such as washing machine, electric drier, water heater, heat pump, AC, electric stove, coffee maker, well pump and other high initial surge appliances.
3. Auto-mode is not available for portable generators. The time for portable generators to boot varies by the brand and model, and may be up to 30 minutes.
4. The generator exercise feature is not available for portable generators.

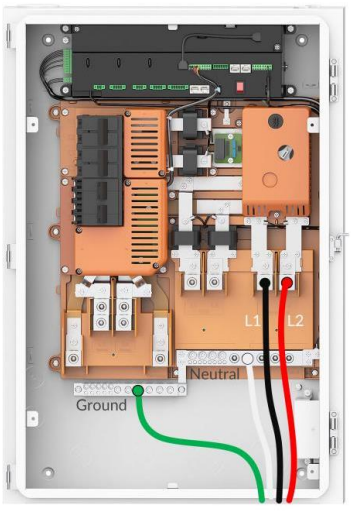
Portable Generator Connection Procedure

Following the steps outlined below to ensure the safety of the installer/electrician.

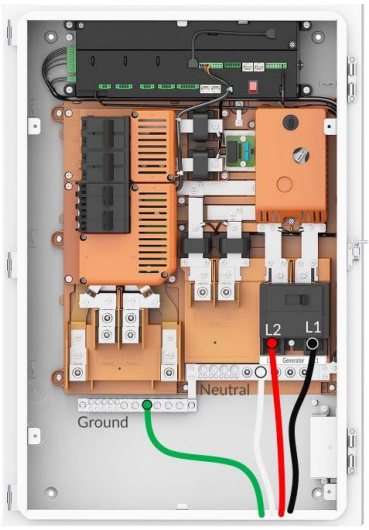
NOTE:
All installations must comply with national and local electrical codes and standards. Only certified installers and qualified electricians shall perform the procedure.

1. **Power down the system**
   Turn off the upstream and downstream circuit breakers and switches and lock them. Wait at least five (5) minutes.
2. **Remove the aGate inner panel**
   a) Loosen and remove the four M5 x 12 screws using a Phillips head screwdriver, and remove the aGate inner panel.
   b) Use a multimeter to check that the AC voltages at both input and output terminals of the aGate are zero (0), to ensure that all electrical equipment has been disconnected from the aGate.
3. **Check and make sure the following breakers inside the aGate are turned OFF.**
   a) Grid breaker (if any).
   b) PV breaker.
   c) aPower breaker.
   d) Smart Circuits breaker.
   e) Generator breaker (if any).
   f) Backup breaker (if any).
4. **Confirm that the generator is ready to be connected to the aGate**
   a) The generator power switch is turned OFF and the generator is shut down.
   b) The generator has fuel.
5. **Connect the generator to the aGate**
   a) Connect the generator power output wires (E1, E2, NEU, GND) to the generator input terminals on aGate (L1, L2, Neutral & GND), as shown below.

Without generator breaker

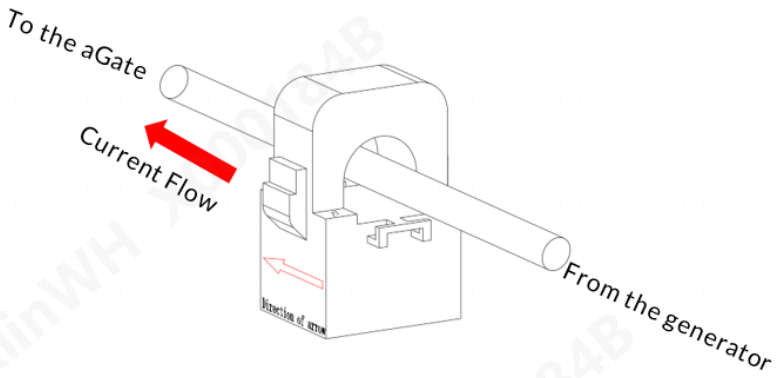


With generator breaker



6. **Install the CT.**

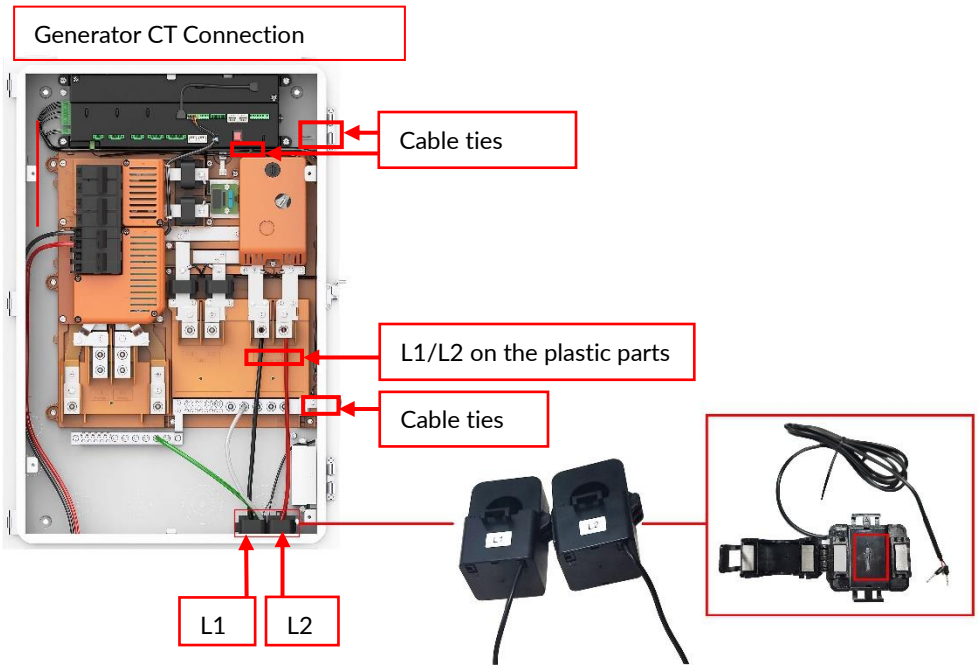
a) Lift the clip and put it on the cable with arrow pointing up. The arrow should be pointed from the generator towards the aGate, in the direction of the current.



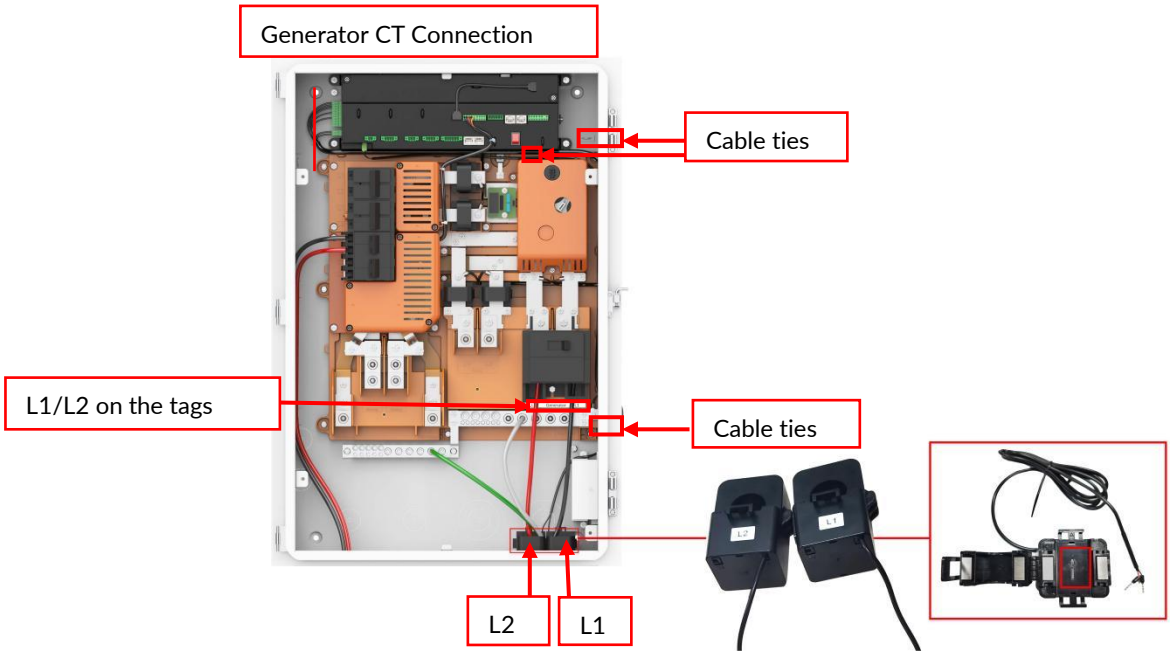
- If there is no generator breaker installed, the L1/L2 connectors on the CT should correspond with the L1/L2 marks printed on the plastic parts.
- If there is a generator breaker installed, the L1/L2 connectors on the CT should correspond with the L1/L2 marks on the tags.

b) Wiring the components. Connect the CT wires to the terminals shown in the figure. The CT wires are positioned on the inner walls of the aGate. Use cable ties for the CT wires at the positions shown in the images below, then remove the excess.

Without a generator breaker



With a generator breaker

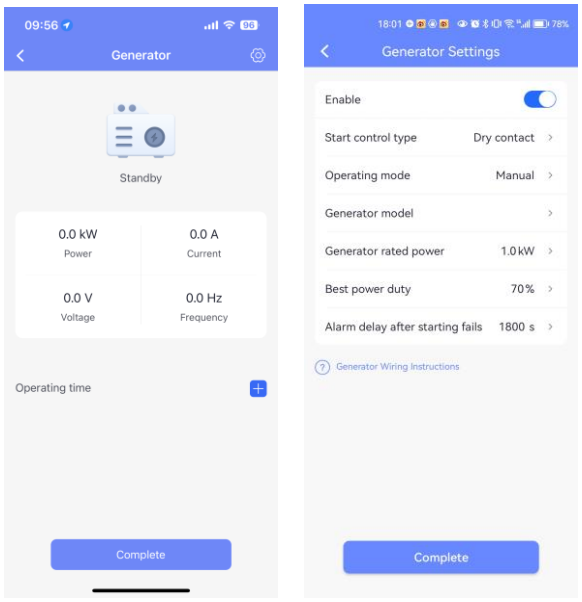


c) Close the CT snap joints.

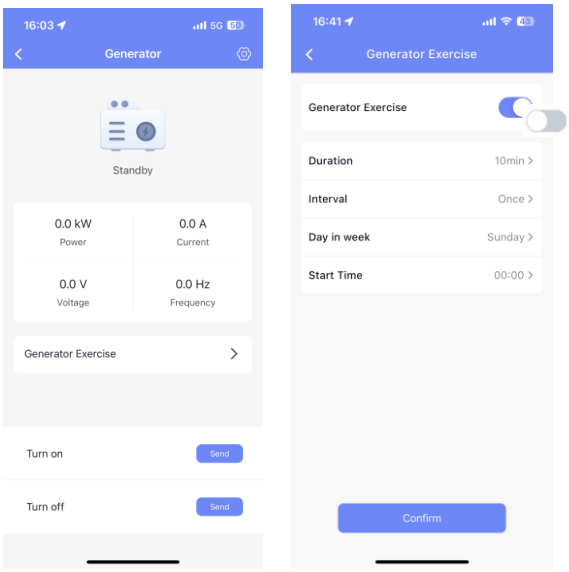
Portable Generator Configuration Using the FranklinWH App

Login to the FranklinWH App on the installer account and navigate to the **Generator** screen.

1. Click on the Settings icon (the gear) in the upper right corner to enter **Generator Settings** page.
2. Click the toggle button to enable the generator function.
3. Set the **Start control type** to Dry contact.
4. Set the **Operating mode** to Manual.
5. Input the **Generator rated power** according to the generator nameplate.
6. Configure the **Best power duty** to 50%.



7. Go to **Generator Exercise** page and disable the **Generator Exercise** function.

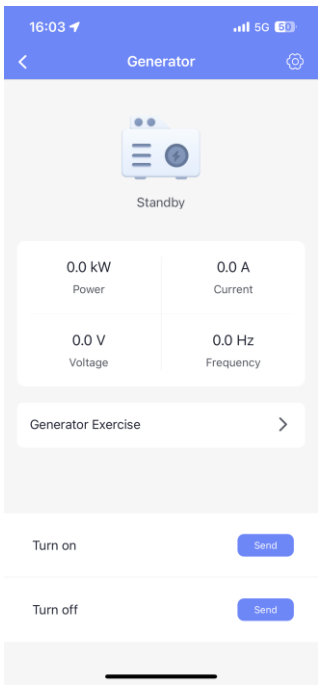


Functional Verification Procedure:

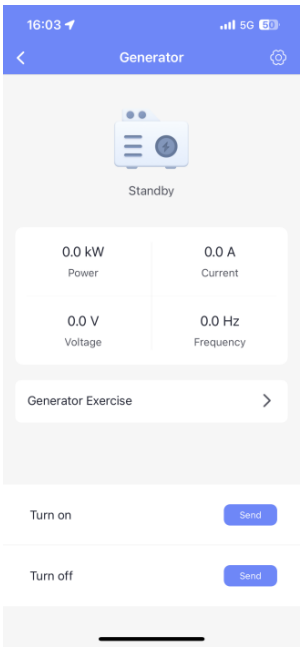
1. Start the system:
   a) Turn on the aGate power switch.
   b) Turn on the aPower breaker on the aGate.
   c) Turn on all other switches between the aGate and the aPower unit(s).
   d) Turn on the aPower switches on the side of each aPower.

   NOTE: If there are multiple aPower batteries in an FHP system, turn on aPower switches in sequence. Check whether the FranklinWH App reports any alarm for each activation.

   e) Turn on the generator breaker inside the aGate (if any).
   f) Turn on the generator switch.
   g) Login the FranklinWH App with the homeowner account, navigate to **Generator** page, click **Send** under **Turn on**. Note that the generator status must be standby when performing this action.
   h) Manually turn on the generator, then wait and observe if there are voltage and frequency readings showing on the **Generator** page in the app.



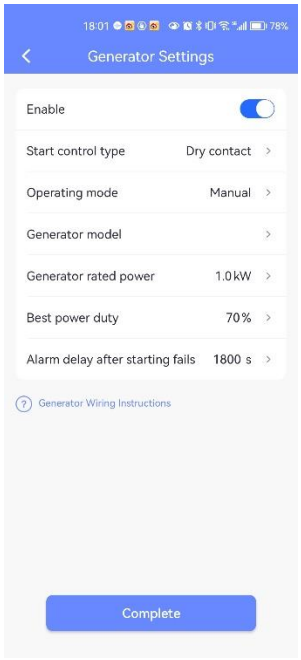
2. Observe whether the parameter readings on the **Generator** screen are as the settings documented in the "Generator Configuration Using the FranklinWH App" section.



NOTE: If the generator failed to boot up after more than 10 mins, go to the **Generator Settings** page in the app, and perform the following actions:

a) Click the toggle button to disable the generator function, then click **Complete** to save the configuration.

b) Re-click the toggle to enable the generator function, then click **Complete** to save the configuration.



3. Click **Send** under **Turn off** in the **Generator** screen on the installer app to disconnect the generator.
4. Turn off the generator power switch.