

Title	Franklin Home Power User Manual			FRANKLINWH	
Date	August 10, 2021	Doc. No.	FD21081001	Revision	V01

Franklin Home Power

User Manual



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Warranty

To be sure the warranty items and optimal performance and reliability, the Franklin Home Power must be installed according to the installation guide.

Franklin Home Power is intended to operate with communication connections, such as WIFI, 4G, and Ethernet. Please make sure that you keep a communication connection at least for product health checking, OTA upgrading, maintenance, etc. Failure to maintain an internet connection may have an impact on the warranty.

Environment protection



Waste electrical (including batteries inside) should not be disposed of with household waste. For the dealing method please refer to your local codes for the parts recycles.

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Revision

N o.	Descriptions	Date	Remark
1	Pre-Release	August 10, 2021	

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TAKE CARE OF SAFETY INSTRUCTIONS IMPORTANTLY

Knowledge First

Important! Please read and knowledge this section to be sure to use the product correctly, otherwise, any abuse will cause the warranty failure.

Franklin Home Power (FHP) is a residential energy storage and management system with battery pack inside. It is operated only by FrnaklinWH company trained and qualified personals.

Please ensure you read this manual and knowledge of the items of danger, warning, and notice following in this section until you will use the product Franklin Home Power. You will extreme caution and operation carefully by the instructions and caution of danger, warning, note in this document, otherwise, it will result in electrical shock, serious injury, unit damage, even death danger.

Do not open any covers from aPower and aGate before the unit installation.

Do not push aPower on/off button until the unit installation needs.

Do not open the aPower battery pack and unit power converted whenever.

Symbols in This Document

Following icons will be used in this document to highlight the safety important information.



Danger indicates that there has a hazardous situation, which if not avoided, will result in injury or death. Ensure extreme caution and follow the instructions carefully when you operate the units.



Warning indicates that there has a hazardous situation, which if not avoided, will result in a minor injury safety hazard or caused the equipment out of order, damage, etc. Ensure extreme caution and follow the instructions carefully when you operate the units.



Note indicates that there has the information or step, tips that lead the unit to best optimal but it is not safety or damage related. Ensure caution and follow the instruction carefully when you operate the units.

Safety information required

Danger! A battery can present a risk of electrical shock, fire, or air explosion from a safety relief valve. The relief valve is to relieve the gas in time when the battery abuse using and only gas smoking venting out of the valve with only the lithium iron phosphate battery inside which will be much safer. Only FrnaklinWH trained and authorized personal can replace, install, and commission the unit.

Do not abuse use the battery and observe proper precautions.

Danger! FHP installation must be carried out only by FrnaklinWH trained and authorized installers with utility

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electric 240VAC voltage operation.

 Danger! FHP is heavy. Recommended using lift moving the units.

 Danger! Do not use FHP if it is cracked, defective, broken, and others damaged or fail to operate.

 Danger! Check and ensure the aPower on/off button is off (button push down little and no LED light on before unit installation and wiring installation. Ensure circuit breakers in or to aGate are switched off before unit installation and wiring installation.

 Danger! Do not attempt to disassemble, open, repair, modify or replace FHP. FHP and its components are not user-serviceable. Batteries in the packed case are not replaceable. Call the unit installer trained and authorized personal who installed your units for any repairs.

 Danger! Do not impact, pull drag, or step on the unit aPower, aGate, packed materials to protect FHP from damage when transporting. Do not subject any strong force to FHP. Keep the product units into the package upward until they have arrived at the installation site.

 Danger! Do not insert any objects into FHP and rotated fans in the back. Do not block any, such as the case top, bottom, left side, right side. Keep the unit vented and no any blocks around.

 Danger! Do not expose FHP to direct fire, flame, or heat sources, etc.

 Danger! Do not immerse FHP in water or other fluids.

 Danger! Ensure the installation height prevents water ingress otherwise there will be a risk of electric shock while the flooding possible.

 Danger! Ensure the FHP storage and operating environment is not out of the range specified otherwise it will cause the FHP damage! Do not expose the FHP to ambient over 50degC (122degF) or less -20degC (-4degF).

 Danger! Keep FHP works well and do not stop it when you leaving the house for a long time. Do not push aPower on/off button off. Do not disconnect the power supply from solar input and grid input to unit aGate and aPower connection well. It is not warranted!

 Danger! Please do not abuse the products with huge loads when the grid-off. It is not warranted!

 Danger! Ensure use carbon dioxide fire extinguisher or aerosol extinguisher, etc. to put out the fire.

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⚠ Warning! Do not use solvents liquid to clean the FHP or expose the FHP product to harsh chemicals or vapors.

⚠ Warning! Do not place FHP out of the storage environment. Ensure the aPower recharge in time when the storage is over the specified duration according to the related recharge guidance document.

⚠ Warning! Do not paint any part of FHP, including any internal or external surface or components, such as case, brand, labels, etc.

⚠ Warning! Do not connect PV solar panels directly (DC voltage wiring).

⚠ Warning! Do not confuse the inputs connections of the grid, PV, genset, etc.

⚠ Warning! Keep FHP out of the driving path when the installation is in the garage or near the vehicles. Ensure the vehicles can't crush to FHP.

⚠ Warning! Ensure there are no water drops to FHP and water sources around FHP including downspouts, sprinklers, or faucets.

⚠ Warning! Ensure there is no snow accumulated around the FHP.

⚠ Warning! Do not use it for portable use. It is designed as a stationary installation.

 Note that the protection against lightning and voltage surges must be following local standards.

 Note that unapproved attachments or accessories are not permitted which will result in damage or injury.

 Keep the FHP equipment in a good environment during use, storage, and transportation,

 Ventilated space

 Away from heat, sparks, and sunlight radiation

 Away from dust, corrosive and explosive gases, oil, and smoke, gas exhaust.

 Far away from the vibration

 Far away from failing or moving objects.

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Abbreviations

- ✓ FHP—Franklin Home Power
- ✓ LFP—Lithium Iron Phosphate battery
- ✓ PCS—Power converters system
- ✓ PE—Power element, PCS in a PE box
- ✓ pcs—pieces
- ✓ EPO—Emergency power off
- ✓ VPP—Virtual Power Plant
- ✓ TOU—Time of use

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1. What's Franklin Home Power (FHP)

1.1 Solutions

With frequent power grid collapses caused by extreme weather, wildfires, blizzards, etc., American households increasingly desire a decentralized energy storage solution that is powerful, reliable, yet simple to use.

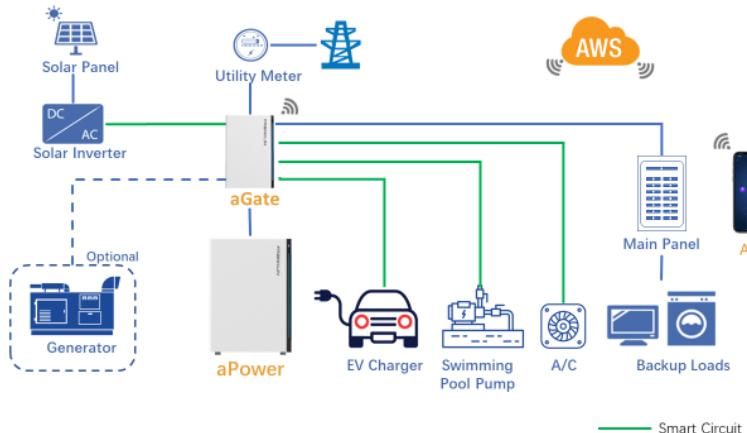
Franklin Home Power (FHP) provides an all-in-one home energy solution based on AC battery and AI-integrated technologies to give everyone maximum comfort, control, and energy security.

FHP enlarge your energy usage and benefit from solar self-consumption and grid time of use and generator emergency and VPP as well as your activated energy at 100% grid off.

FHP supports inputs of the grid, solar inverters, and optional generator as well as outputs the whole-home backup loads and smart circuits. FHP provides you APP for user control and view management.

FHP support whole-home backup loads and reserved non-backup load ports for you to simplify the whole home load connection.

Figure Franklin Home Power Solution



1.2 Key features

With FHP, you will enjoy peace of mind with energy freedom.

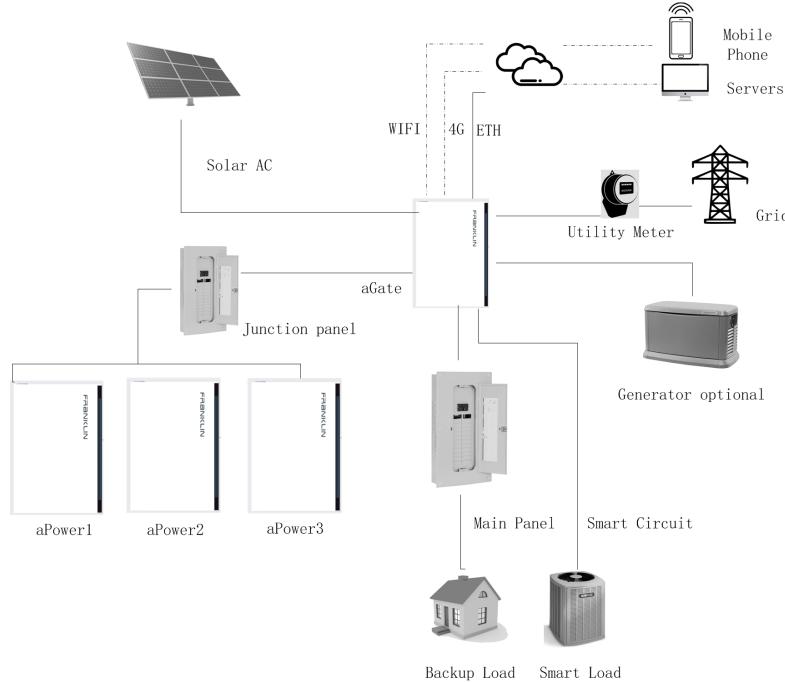
Figure Use revenues List

 Whole-home Backup Up to 10kW Max. 4-Ton A.C. Bootup	 Long Lifespan 43 MWh 12 Years Warranty	 Sustainable Solar Black-Start Genset Backup, 100% off-grid
 Flexible Smart Circuits EV Charger Ready Scalability up to 15 Units	 Friendly Safer Lithium Iron Phosphate Battery Ultra-Silence up to 30dB(A) Seamless Power Transfer, <16ms	 Easy Installation Simple Mounting Fast Wiring

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1.3 Whole-home loads backup

Figure Whole-home loads backup

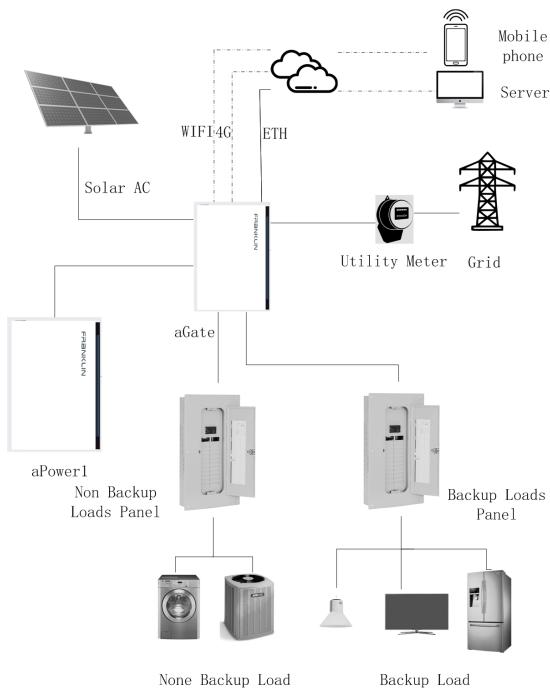


This is the preferred backup for your whole-home loads. Franklin Home Power will transfer all your home loads to backup power when the grid outage. You can use the smart circuit also to remote your heavy duty on/off on time or manually, such as air conditioner, pool pump, etc. to enlarge your backup time. You can also remote garage door, EV charger work from smart circuit. Reminder it needs a junction panel for more aPowers (at least 2 aPowers) power connection paralleled.

1.4 Partial-home loads backup

aGate reserves a non-backup load connection. And it is an easy installation for you to expand the non-essential load without backup.

Figure Partial-home loads backup



This is the preferred backup for your essential home loads. Franklin Home Power will transfer your essential home loads to backup power when the grid outage.

In the connections, you will use 2 sub-panels, one is for home loads backup and the other is for home loads non-backup.

The essential home loads include the device of light, communication, IT and computer, refrigerators, electrical heat and/or air conditioner. The installer will confirm with you what type loads will be connected into your backup loads panel.

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2. Warranty

FHP product has a limited warranty whose terms are described in the warranty letter. Please contacts your agent to get the warranty letter and knowledge of the details.

To be sure of the warranty of Franklin Home Power, it must be connected to the internet firmly at least one connectivity. Otherwise, your warranty couldn't be sure.

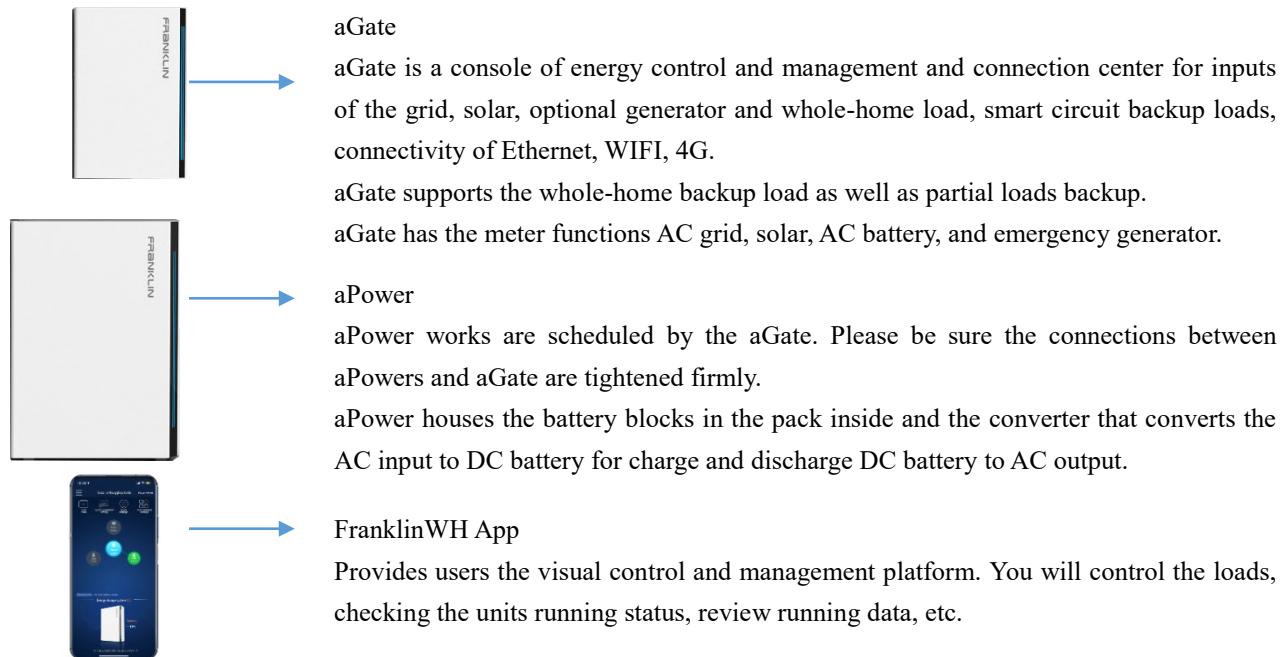
Please be sure you read and acknowledge the warranty letter.

3. Product's overview

3.1 System elements

FHP is a home energy management and storage system for residential and light commercial uses which consists of 3 parts, aPower, aGate, and FranklinWH App.

Figure FHP system elements units

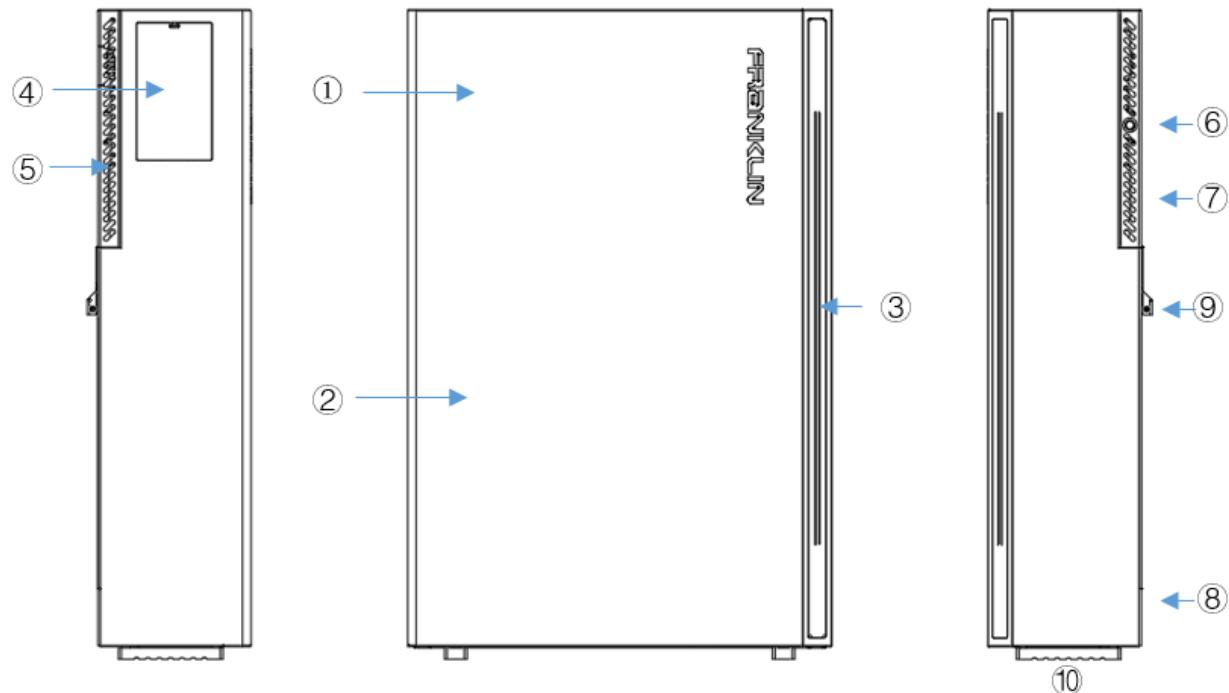


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3.2 aPower

The below shows the aPowers appearance and components and features.

Figure aPower appearance and components



Items	Descriptions	Remarks
1	Power converters system (PE) inside	It can be replaced by maintenance required
2	Battery full pack with BMS inside	
3	LED indicator	Indicates the unit status
4	Wiring compartment	Provides the connection ports to aGate
5	Vented grille	There have 3 plates on the left, right, and top.
6	aPower on/off button	Default the button off during shipping and storage. It is required to push the button down a little as on to power on the aPower and LED will be lighted after the aPower is installed completely until emergency stop when maintenance or replacement.
7	Air vent outlet	At the upper of the unit back The battery pack has a heatsink and fans cooling at the unit back The PE unit has a heatsink at the top of the unit.
8	Air vent inlet	At the back bottom
9	Mounting hook	
10	Legs support	

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3.3 aPower LED indicating

aPower has a LED indicator on the right, consists of 5 section lights. The definition is described below.

Figure Definition of LED indicating of SOC status

SOC	Indicating	Remarks
80%<SOC≤100%	Section 1/2/3/4/5 on and solid from the bottom	
60%<SOC≤80%	Section 1/2/3/4 on and solid from the bottom and last section 5 at the top is off	
40%<SOC≤60%	Section 1/2/3 on and solid from the bottom and last section 4/5 at the top are off	
20%<SOC≤40%	Section 1/2 on and solid from the bottom and last section 3/4/5 at the top are off	
0%<SOC≤20%	Section 1 on and solid from the bottom and last section 2/3/4/5 at the top are off	

Table LED indicating of aPower work status

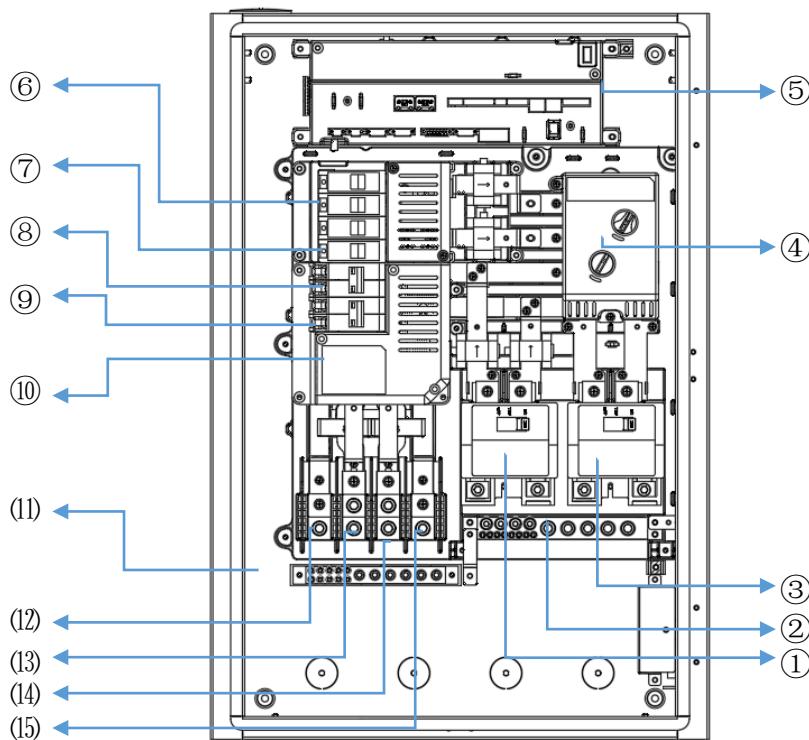
Works	Indicating	Remarks
Power On	The LED indicator is flashing from top to bottom and keep section light one by one, total duration of 4 seconds flashing, and then enter the SOC status	
Charging	Sections of SOC are on and solid, and the charging section is flash on/off with a cycle of 4 seconds.	With communication
Discharge and Ready status	Sections of SOC is on and solid	With communication
Energy empty/remote off/fault	All LED sections off	With communication

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3.4 aGate

The below show the aGate board and features.

Figure aGate board and features



 **Danger!** Do not operate connecting/disconnecting when the aGate power is on even the signal terminal.

Otherwise, it will cause the unit broken but Ethernet cables are accepted.

Table aGate Device List

Items	Descriptions	Device volume size	Remarks
1	Grid circuit breaker	Maximum 200A	Blanked, configured by installer
2	Neutral bars		
3	Generator circuit breaker	Maximum 200A	Blanked, configured by installer
4	Relays		Grid input relay is installed default Generator input relay is optional and blanked default  Danger! Do not turn the relay's handle while power on. Otherwise, it will cause the system broken.
5	EMU unit		
6	Solar breaker, 2P, L1/L2	Maximum 80A	Blanked, configured by installer
7	aPower breaker, 2P, L1/L2	Maximum 100A	Blanked, configured by installer
8	Load 1 breaker, 2P, L1/L2,	Maximum 80A	Blanked, configured by installer

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	smart circuit		L2 on/off can be remoted		
9	Load 2 breaker, 2P, L1/L2, smart circuit	Maximum 50A	Blanked, configured by installer L1/L2 on/off can be remoted		
10	Smart Circuit module				
11	PE bar				
12	Load block, single connection, L1, Non-backup load	200A maximum			
13	Load block, dual connections, L1, backup load, aPower	200A maximum			
14	Load block, dual connections, L2, backup load, aPower	200A maximum			
15	Load block, single connection, L2, Non-backup load	200A maximum			

Table Optional circuit breakers for inputs of the grid and genset

S/N	Model	Current	Description
1	CSR2100	100A	Eaton#Circuit Breaker; 2-Pole, 25kAIC, 100A/240V
2	CSR2125N	125A	Eaton#Circuit Breaker; 2-Pole, 25kAIC, 125A/240V
3	CSR2150N	150A	Eaton#Circuit Breaker; 2-Pole, 25kAIC, 150A/240V
4	CSR2175N	175A	Eaton#Circuit Breaker; 2-Pole, 25kAIC, 175A/240V
5	CSR2200N	200A	Eaton#Circuit Breaker; 2-Pole, 25kAIC, 200A/240V
6	BW2100	100A	Eaton#Circuit Breaker; 2-Pole, 10kAIC, 100A/240V
7	BW2125	125A	Eaton#Circuit Breaker; 2-Pole, 10kAIC, 125A/240V
8	BW2150	150A	Eaton#Circuit Breaker; 2-Pole, 10kAIC, 150A/240V
9	BW2175	175A	Eaton#Circuit Breaker; 2-Pole, 10kAIC, 175A/240V
10	BW2200	200A	Eaton#Circuit Breaker; 2-Pole, 10kAIC, 200A/240V
11	BWH2100N	100A	Eaton#Circuit Breaker; 2-Pole, 25kAIC, 100A/240V
12	BWH2125N	125A	Eaton#Circuit Breaker; 2-Pole, 25kAIC, 125A/240V
13	BWH2150N	150A	Eaton#Circuit Breaker; 2-Pole, 25kAIC, 150A/240V
14	BWH2175N	175A	Eaton#Circuit Breaker; 2-Pole, 25kAIC, 175A/240V
15	BWH2200N	200A	Eaton#Circuit Breaker; 2-Pole, 25kAIC, 200A/240V

Table Optional circuit breakers configuration by installer

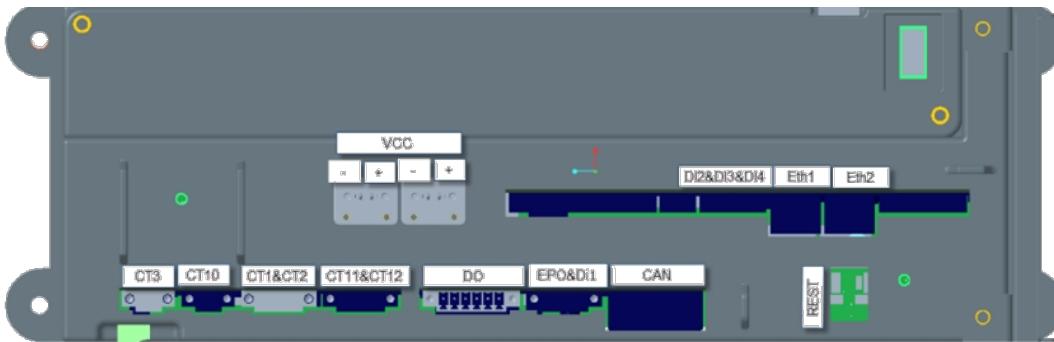
Item	Model Number	Descriptions	Remarks
1	BR230	Eaton#Circuit Breaker;2-Pole, 10kAIC, 30A/240V	For solar, aPower
2	BR240	Eaton#Circuit Breaker;2-Pole, 10kAIC, 40A/240V	For solar, aPower
3	BR250	Eaton#Circuit Breaker;2-Pole, 10kAIC, 50A/240V	For solar, aPower
4	BR260	Eaton#Circuit Breaker;2-Pole, 10kAIC, 60A/240V	For solar, aPower
5	BR270	Eaton#Circuit Breaker;2-Pole, 10kAIC, 70A/240V	For solar, aPower
6	BR280	Eaton#Circuit Breaker;2-Pole, 10kAIC, 80A/240V	For solar, aPower

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7	BR290	Eaton#Circuit Breaker;2-Pole, 10kAIC, 90A/240V	For solar, aPower
8	BRH230	Eaton#Circuit Breaker;2-Pole, 22kAIC, 30A/240V	For solar, aPower
9	BRH240	Eaton#Circuit Breaker;2-Pole, 22kAIC, 40A/240V	For solar, aPower
10	BRH250	Eaton#Circuit Breaker;2-Pole, 22kAIC, 50A/240V	For solar, aPower
11	BRH260	Eaton#Circuit Breaker;2-Pole, 22kAIC, 60A/240V	For solar, aPower
12	BRH270	Eaton#Circuit Breaker;2-Pole, 22kAIC, 70A/240V	For solar, aPower
13	BRH280	Eaton#Circuit Breaker;2-Pole, 22kAIC, 80A/240V	For solar, aPower
14	BRH290	Eaton#Circuit Breaker;2-Pole, 22kAIC, 90A/240V	For solar, aPower
15	BRH290	Eaton#Circuit Breaker;2-Pole, 22kAIC, 100A/240V	For solar, aPower
16	CH230	Eaton#Circuit Breaker;2-Pole, 10kAIC, 30A/240V	Load 1, load 2
17	CH235	Eaton#Circuit Breaker;2-Pole, 10kAIC, 35A/240V	Load 1, load 2
18	CH240	Eaton#Circuit Breaker;2-Pole, 10kAIC, 40A/240V	Load 1, load 2
19	CH245	Eaton#Circuit Breaker;2-Pole, 10kAIC, 45A/240V	Load 1, load 2
20	CH250	Eaton#Circuit Breaker;2-Pole, 10kAIC, 50A/240V	Load 1, load 2
21	CH260	Eaton#Circuit Breaker;2-Pole, 10kAIC, 60A/240V	Load 1
22	CH270	Eaton#Circuit Breaker;2-Pole, 10kAIC, 70A/240V	Load 1
23	CH280	Eaton#Circuit Breaker;2-Pole, 10kAIC, 80A/240V	Load 1
24	CHF230	Eaton#Circuit Breaker;2-Pole, 10kAIC, 30A/240V	Load 1, load 2
25	CHF235	Eaton#Circuit Breaker;2-Pole, 10kAIC, 35A/240V	Load 1, load 2
26	CHF240	Eaton#Circuit Breaker;2-Pole, 10kAIC, 40A/240V	Load 1, load 2
27	CHF245	Eaton#Circuit Breaker;2-Pole, 10kAIC, 45A/240V	Load 1, load 2
28	CHF250	Eaton#Circuit Breaker;2-Pole, 10kAIC, 50A/240V	Load 1, load 2

3.5 EMU interface

Figure EMU interface



⚠ Warning! Keep the cables and terminal in order. Do not pull out or insert the terminals when the signal or power cables are live. Otherwise, it will cause the unit broken.

Table EMU interfaces

Port	Use	Remark
CT10	For Smart Circuit CT	Reserved
DO	For generator start signal, NO	Reserved

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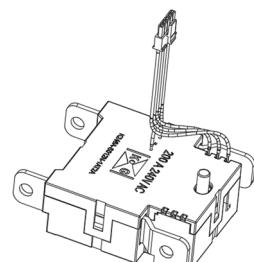
	type		
EPO	EPO connection, NC type	Reserved	
DI1	Generator alarm, NO type	Reserved	
CAN IN	Communication between aGate and aPoewers	Loop-in wiring system.	
CAN OUT		If the loop is broken (2 CAN cables are broken), the power system will be off. Only 1 CAN cable is broken, the system works well.	
VCC IN	20VDC from aPower	Loop-in wiring system	
VCC OUT		If the loop is broken (VCC in/VCC out cables are all broken), the system will power off when the grid/solar is off. Otherwise, the system will work well.	
DI2	NO type	Reserved	
DI3	NO type	Reserved	
DI4	NO type	Reserved	
Eth1	100M, Ethernet ports to the home gateway or VPP networks	Plug and play	
Eth2			
SIM card	Support the U.S. and Canadian standards GSM, WCDMA, CDMA EVDO, CDMA2000, LTE (FDD), LTE (TDD), Mobile network, cloud access (alternate channel)		
CT5, CT6, (J7)	Grid CT connection		
4G/WIFI	4G/WIFI connection		
SMART RELAY	Connect to smart circuit relay in aGate		
SOLAR RELAY	Connect to the solar board in aGate		
RS485	Connect to AC meter in aGate		

3.6 aGate optional

1) Optional generator circuit relay

The generator circuit connection is blanked by default. The

Figure Optional generator circuit relay



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generator circuit has the input circuit breaker and the relay. Breakers are list in the above table. The relay is listed below. The generator circuit relay will provide by FranklinWH.

2) Optional EPO button

The installer will configure the EPO button by the local regulations.

EPO button will be wired into the aGate EMU box and lead out of the aGate box. EPO button will be the wall mount type and it will mount on the wall near the aGate or somewhere more convenient.

The EPO type is NC (normal close).

Figure Example of Eaton EPO (NC type)



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4. Datasheet

4.1 aPower datasheet

Table aPower datasheet

PERFORMANCE SPECIFICATION		COMPLIANCE INFORMATION	
Battery Type	Lithium Iron Phosphate (LFP)	Certificate	UL1973, UL9540, UL9540A, UN38.3, UL1741, IEEE 1547, IEEE 1547.1, EMI: Part 15, Class B
Usable Capacity	13.6kWh ¹	Seismic	ACI56, IEE693-2005 (High)
Aggregate Throughput	43MWh ²	Environmental	RoHS Directive 2011/EU California Proposition 65
Coupling Type	AC Coupling	Emissions	FCC Part 15 Class B
Rated Input/Output Voltage	120/240VAC split	MECHANICAL SPECIFICATION	
Feed-in Type	Split phase	Dimensions (H x W x D)	45.3in x 29.5in x 11.4in 1150mm x 750mm x 290mm
Connection Support	L1/L2/N/PE	Net Weight	386lbs. (175kg) ⁵
Grid Frequency	60Hz	Volume	234L
Real Power, Maximum Continuous	5kW	Mounting	Wall mount or floor mount
Real Power, Peak(10s, off-grid/backup)	10kW (Discharge)	ENVIRONMENTAL SPECIFICATION	
Apparent Power, Max Continuous	5.8kVA	Operating Temperature	-4°F to 122°F (-20°C to 50°C) ⁶
Apparent Power, Peak (10s, off-grid/backup)	10kVA (Discharge)	Recommended Temperature	32°F to 86°F (0°C to 30°C)
Load Start Capacity	110A LRA	Operating Humidity (RH)	Up to 100% condensing
Maximum Supply Fault Current	10kA	Recommended Storage Temperature	-4°F to 86°F (-20°C to 30°C) Up to 95%RH, non-condensing
Maximum Output Fault Current	42A	Maximum Elevation	9843 feet (3000m)
Imbalance for Split-phase Loads	100%	Environment	Indoor or Outdoor
Power Factor Range (Full-rated Power)	-0.85 to +0.85	Enclosure Type	Type 3R
Round Trip Efficiency	86% ^{3,4}	Ingress Rating	IP67 (Battery and Power Converted System)
Inverter Topology	Isolated		IP56 (Wiring Compartment)
Warranty	12 years	Noise Level	<30dB(A) optimal, <45dB(A) maximum

1. Measured at battery DC output at beginning of life
2. 70% EOL at warranty 12 years and measured at battery AC output.
3. At 25°C (77°F) 2.5kW charge/discharge power
4. AC to battery to AC at beginning of life
5. The net weight doesn't include the installation bracket.
6. Performance will be derated when the operation temperature >45°C

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4.2 aGate datasheet

Table aGate datasheet

PERFORMANCE SPECIFICATION		COMPLIANCE INFORMATION	
AC Voltage (Nominal)	120/240VAC	Certificate	UL1741 PCS, UL67 ¹ , UL869A ¹ , UL916
Feed-in Phase	Split, L1/L2/N/PE	Emission	FCC Part 15 Class B ²
Grid Frequency		MECHANICAL SPECIFICATION	
Overcurrent Protection Device	200A maximum	Dimensions (H x W x D)	31.5in x 21.7in x 6.3in (800mm x 550mm x 160mm)
Maximum Input Short Circuit Current	10kA	Weight	48lbs. (22kg)
Overvoltage Category	Category IV	Mounting	Wall mount or Semi-flush mount
AC Meter		ENVIRONMENTAL SPECIFICATION	
Backup Transition	<16ms	Operation Temperature Range	-4°F to 122°F (-20°C to 50°C)
Connectivity	Ethernet, WIFI, 4G	Operating Humidity (RH)	Up to 95%RH, no condensing
Work Modes		Maximum Elevation	9843 feet (3000m)
User Interface	FranklinWH APP	Environment	Indoor and outdoor rated
Solar Input Protection Device	80A Max.	Enclosure Type	Type 3R
Genset Overcurrent Protection Device	200A Max. (Optional)		
Smart Circuit Protection Device (Optional)	1*80A Max. @240V 2*50A Max. @120V		
Scalability	Up to 15 aPowers		
Warranty	12 years		

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FCC WARING:

- 1, Sections from these standards were used during the safety evaluation and listed in the UL 1741.
- 2, This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
- 3: To satisfy FCC RF exposure requirements, a separation distance of 20 cm or more should be maintained between the antenna of this device and persons during device operation. To ensure compliance, operations at closer than this distance is not recommended.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

RSS Statement (Canada)

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

- (1) This device may not cause interference.
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

Declaration de conformite avec le CNR (Canada's)

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

- 1) L'appareil ne doit pas produire de brouillage;
- 2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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5. System care

aPower is an outdoor environmental installation rated. It has the IP67 grade for the battery pack cabin and power converter system cabin. And IP56 for the wiring compartment. Do not be immersed in water or flood.	Recommended that a smoker is installed near the aPower if installed indoor environment and connected to home fire system by local regulations required.
Do not block the vent in aPower back at the bottom and top, sides left/right as well as around aPowers Never rest any objects on top of aPowers.	aPowers are installed in the space without sunlight radiation directly as well as no heat radiation source, flammable, sparking, or explosive object near the aPowers.
Keep aPowers away from the moving objects whatever it falls onto or collides to aPowers.	Timely sweep up the aPowers from dust, leaves, etc. Timely clean the units using water only or soft wet cloth. Do not use cleaning solvents or harsh chemicals on the equipment.

6. System information

Please note that,

- 1) The aPower system information is in the nameplate on the panel in the wiring compartment
- 2) The aGate system information is in the nameplate on the aGate inner panel.

7. Monitoring and management

You can monitor and visually review your system and modify your system settings by FranklinWH APP.

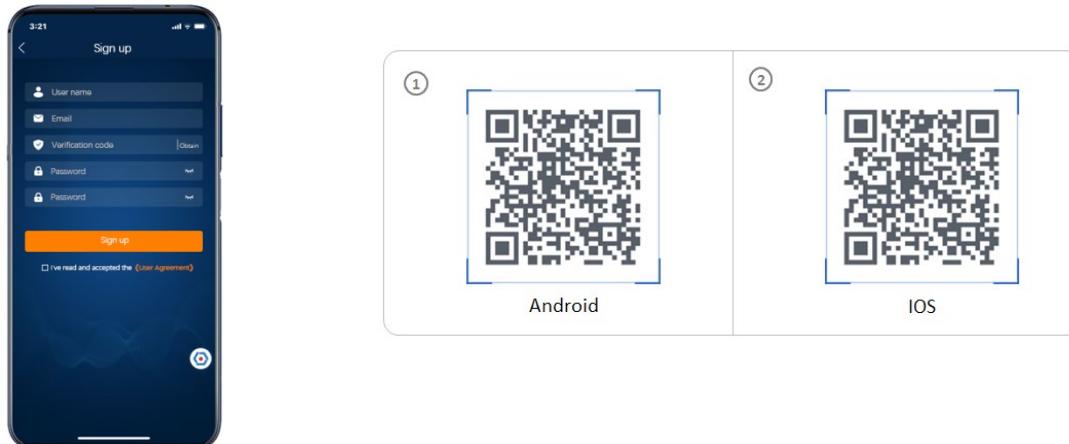
Instructions to activate your FranklinWH account are sent to you at the email address provided to FranklinWH by your installer. Be sure to unblock this address Franklin-wh.com from your spam or junk email filters.

FranklinWH APP

Download and install FranklinWH APP.

Channel I: Scan the QR code to download and install APP.

Channel II: Search FranklinWH in AppStore/ GooglePlay to download and install APP

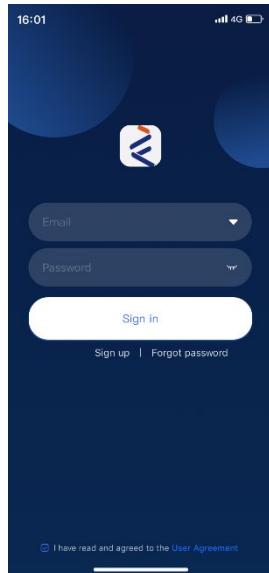


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8. System operation

FranklinWH APP is configured to monitor and manage your home loads.

This section guide you to understand your FranklinWH APP operation.



- First, you'd register and apply for a user account. The installer will help you to build it.
- In the way, you'd better have one connectivity at least of Ethernet or WIFI or 4G and enable the connectivity.

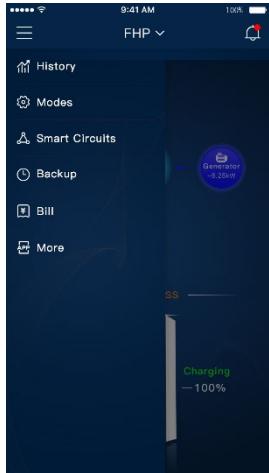
1) Main UI



- In this section, you will review the system's running information shown as left interface picture, including the solar, grid, FHP, generator, home loads, etc.
- The menu is listed at the left-top corner and the message is listed at the right-top corner.
- The menu list includes the APP settings, history, work setting, data, etc.

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2) APP menu

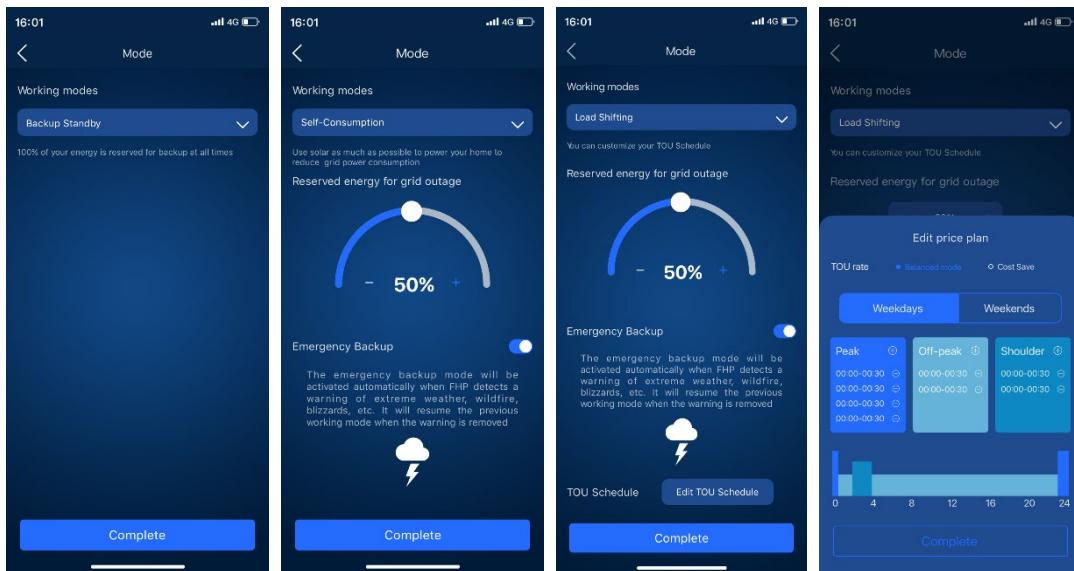


- The menu is listed in the figure left, including History, Mode, Smart Circuits, Backup, Bill, Others.

3) Mode UI

FranklinWH APP provide you many types control modes, such as the self-consumption, load shifting, backup standby, emergency backup as well as the smart circuit, etc.

In this section, you will select the battery advanced work modes and setting the running parameters.



① Self-consumption

It is a solar mode.

Self-consumption mode can double the solar energy amount that powers your home loads. And it is the best way to reduce your carbon footprint until zero export application. It is used commonly in the states of Hawaii and California.

When you select the self-consumption mode, solar power is given priority to home load first during the day. Excess energy can be used to charge aPower. More excess energy exports VPP usage if your utility allows. And at night, the energy in aPower will be provided to your home loads. The grid power will be paired when the solar is not enough for the home loads until the energy in aPower use up.

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How to set up Self-consumption

Step 1, From the main UI screen, click the menu at the left right corner.

Step 2, Under the “mode”, select “Self-Consumption”.

Step 3, Set “reserved capacity for power outage”

② Load shifting

Utility save mode based on time-of-use (TOU) rate schedule. If you offer Time-of-Use rates when you electricity prices rate vary during the day, you can charge the energy in aPowers from solar or the grid power off-peak duration and power your home loads at grid peak duration to maximize saving bills.

You will access the APP to set up the mode configuration setting details of the electric rate schedule.

TOU rates have 3 breaks as below.

- Peak—High energy demand hours with most expensive rates.
- Off-Peak—Low energy demand hours with least expensive rates
- Shoulder—All other times

Load shifting has 2 advanced sub-modes, one is Balanced mode, the other is Cost Save mode. The TOU charge/discharge will comply with local electrical code requirement.

③ Reserved energy for grid outage

You can setting the parameter of “Reserved energy for grid outage” in the modes of “Self-Consumption” and “Load shifting”. Setting a higher reserve percentage protected during an outage. Setting a lower reserve percentage maximizes your home loads allocation and save more bills.

④ Emergency backup mode

Emergency backup mode is embedded in the modes of Self-Consumption and Load Shifting.

The emergency backup mode will be activated automatically when FHP detected a warning of extreme weather, wildfire, blizzards, etc. It will resume the previous mode work when the warning is removed.

Enabling this mode, aGate will subscribe the information of storms, wildfires, blizzards, etc. in advance 24 hours and unconditionally charge aPowers from the solar and grid. Reserve the 100% capacity of aPowers for an outage until the storms are over.

⑤ Backup standby

100% reserve capacity in advance for an outage.

Enabling this mode, your system is re-scheduled to charge aPowers 100% fully from solar and/or grid energy. And then standby for an outage.

aPowers charge from grid energy should be allowed by local regulations.



Note that aPowers charge from grid energy is not allowed when the PV solar is available in the state of California but emergency backup mode.

⑥ Genset

This is the advanced mode of generator standby.

The advance of preferring aPowers discharge when outage and then start generator when aPowers usage less 25% until aPowers' usage up to 90%.

It improves the generator efficiency among home loads and aPowers charging, reduces the generator noise.

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⑦ VPP

aGate compliances with IEEE2030.5 protocol. aGate can enable VPP mode when you sign a VPP contract with the local utility carrier. aGate would be connected to utility carrier's servers and to enable VPP by the policy control.

4) Smart Circuit schedule

In this UI, you will set up the parameters of aPower SOC lower limit, time enable and plan.

Smart circuit can control your load on/off on time automatically or manually.

Smart circuit can serve for air conditioner in summer, swimming pooling pumps, garden lighting, garden gate motor, garage door motor, etc.

5) More operations

- ① OTA upgrading
- ② Remote diagnosis
- ③ History
- ④ Location and time zone settings

9. Maintenance

 Danger! aPower and aGate are not user-serviceable and must be repaired by FranklinWH Technology Co., Ltd trained and authorized installer.

 Keep the wiring connection in order. Do not change the connections inside by user yourself. Do not pull out or insert the terminals of the power cables and signal cables when the cables are active and live.

 If need, please contact the installer or FranklinWH's local service team.

Table spare parts list

Item	Description	Remarks
1	PE unit box	Power inverters system box inside
2	aPower	
3	EMU box	In aGate
4	Grid inputs relay	In aGate
5	Generator inputs relay	In aGate
6	AC meter in aGate	
7	Solar board in aGate	
8	Smart circuit Board	
9	CTs in aGate	

10. Troubleshooting

Please be sure of the following steps if the system is not working normally.

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10.1 Troubleshooting

 Do not open any covers inside the aPower and aGate. An exposed wiring connection can present a risk of electrical shock.

 Do not off the breakers in aGate and junction panel. Do not push the aPower on/off button off. Otherwise, it will cause a blackout and any others fault even impact the warranty.

 If it is necessary to manually disconnect/reconnect to the grid and any, FranklinWH Support/installer will direct you to operate the manual by phone in aGate.

Table, Troubleshooting list

Item	Trouble Description	Troubleshooting	Remark
1	Whole-home load blackout during a backup operation	1, SOC is lower and protected to limit the discharge. APP is online. 2, APP is offline, the battery energy is empty and the aPowers units are all off automatically 3, Manually push the aPower on/off button off	
2	A brownout happening at backup operation	1, Loads larger. Reducing the loads. Otherwise then 2, Check the unit status and SOC at APP 3, Check if any aPower on/off button is off 4, Check if the aPower breaker is off	
3	APP is offline	1, Check if the grid/solar is active or not. If active then, 2, Check if the internet connection is normal or not. If inactive then, 3, Check if the aPowers are off due to lower battery energy protection. 4, Check if the aPowers on/off button push off to cause the aPower off 5, Check if aPower breakers are off 6, Check if VCC connection failed in aGate	

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10.2 Fault alarm list

Franklin Home Power is an integrated system. It will appear any alarms in running duration. You can feedback the warning code and the screenshot as well the simple description to FrnaklinWH service for further supports if the alarms caused the system down.

Below is the typical alarms listed here.

Table, Typical list of system fault alarm

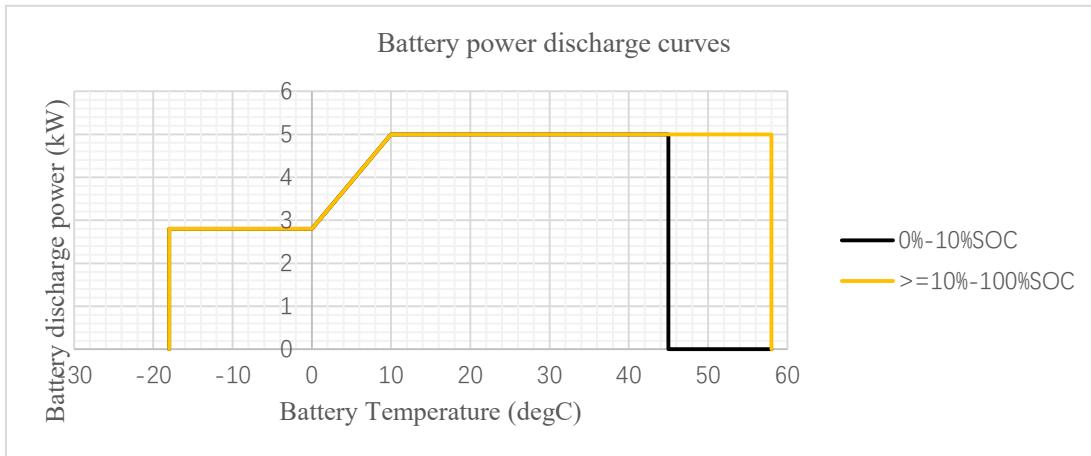
Item	Alarms Description	Alarm Code (HEX)	Triggering	Actions	Service
1	Grid relay close fault	0x1001	The relay is still closed when the relay open signal is sent	aPower off locked	Apply the service
2	Grid relay open fault	0x1002	The relay is still open when the relay close signal is sent	aPower off locked	Apply the service
3	Generator relay close fault	0x1003	The relay is still closed when the relay open signal is sent	aPower off locked	Apply the service
4	Generator relay open fault	0x1004	The relay is still open when the relay close signal is sent	aPower off locked	Apply the service
5	Generator fault	0x1006	Reserved	-	-
6	Backup fault	0x1007	Reserved	-	-
7	FHP general power fault	0x1008	Reserved	-	-
8	DSP communication fault	0x1009	No heartbeat signal from DSP within 5 seconds	aPower off	Apply the service
9	Solar meter communication fault	0x100A	No meter signal received within 5 seconds	aPower off	Apply the service
10	Grid meter communication fault	0x100B	No meter signal received within 5 seconds	aPower off	Apply the service
11	Expands meter communication	0x100C	Reserved	-	-
12	External RS485 fault	0x100D	Reserved	-	-
13	Can fault	0x100E	No can signal received at 5 seconds	aPower off	Apply the service
14	SOC lower alarm	0x100F	SOC<0.3%	aPower shift to Ready status and stop the output	SOC resume >0.3%

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10.3 Power map

Enclosed shows the power maps from the battery. Please re-schedule your home load backup at the environment is less than 0degC in winter when the grid outage.

Figure Battery Power Discharge Curves VS Battery Temperature



Please note that many power factors are shown below. The system perhaps is stopped by protection when it is overload until the loads reducing.

	Grid-on	Grid-off
Charge	Power can be controlled continuously	Power can be on/off controlled
Discharge	Power can be on/off controlled	Power can be on/off controlled

10.4 Turn off the system

Please be sure proper step to turn off the system if it is necessary.

⚠ Danger! aPower has the battery inside and the aGate connects the solar, grid. Please be sure to turn off the external power connection at first and then turn off the aPower on/off button.

- 1) Turn off the solar generation system and disconnect the breaker to aGate.
- 2) Turn off the grid AC breaker to aGate
- 3) Turn off the generator and the AC breaker to aGate
- 4) Turn off the home loads backup breakers
- 5) Turn off the aPower on/off button for 5 minutes at least.

10.5 Turn on the system

Please be sure proper step to turn on the system if it is necessary.

- 1) Turn on aPower on/off button one-by-one and wait for 5 minutes
- 2) Turn on the grid breaker to aGate
- 3) Turn on the solar system and the breaker to aGate
- 4) Turn on the generator breaker to aGate

10.6 Technology support

Please contact your installer or FranklinWH service team at your local as well as the email address

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service@franklin-wh.com.

Be sure you're ready for the following information available when contacting FranklinWH.

- Owner name, registering information
- The best way for FranklinWH local contact you (Address, phone number, email)
- aPower and aGate serial numbers in the product labels
- Brief description for the issue

11. What to do in an emergency case

Be sure you take the below steps first in any heavy threat to health or safety.

- 1) Immediately contact the fire or relevant emergency response team.
- 2) Notice and arrange the people affected to hurry up leave the area.

 And then only below actions suggested you can do if it is safe to do so.

In case of flooding

- ✓ Stay out and keep away from the water if any part of aPower, aGate, or wiring is immersed in water.
- ✓ Turn off AC breakers to aGate, turn off the solar system, and turn off the aPower on/off button if possible.
- ✓ Finding and stop the water flooding source with protective wears if possible.
- ✓ Please note the depth and duration of the flooding.
- ✓ Please be sure the area dry completely and then confirmed with FranklinWH service team or installer that it is safe to turn the system back on.

In case of fire

- ✓ Turn off the aPower on/off button, then the AC breakers to aGate as well as the solar system ASAP.
- ✓ A fire extinguisher of aerosol, water, CO₂, or ABC is acceptable. Avoid type D (flammable metal) extinguishers.

In case of smoking or unusual smell

- ✓ Turn off the aPower on/off button, then the AC breakers to aGate as well as the solar system.
- ✓ Ensure nothing is in contact with aPowers.

--Close--