BigBattery

Own Your Power

BigBattery RAIO All-in-One Home ESS User Manual



Version 1.0

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VERSION 1.0 | INFORMATION SUBJECT TO CHANGE WITHOUT NOTICE

MODEL SKU: FRAIO-075147-G1-GRY + INV-RAIO-G1-GRY | RAIO + RAIO GATEWAY

SCAN THE QR CODE FOR THE LATEST VERSION

VERSION HISTORY

Edition	Date	Chapters	Reason for Change
1.0	10/28/2026	All	Manual development

Document Scope and Terminology

This manual applies to the BigBattery RAIO residential energy storage system and the RAIO GATEWAY. It is intended for homeowners and qualified professional installers. Installation and service work involving high-voltage AC or DC circuits must be performed only by qualified personnel.

For technical accuracy, manufacturer model identifiers, serial-number conventions, firmware alarm names, and certain labels are retained where they correspond to physical nameplates, software, or diagnostic codes. In manufacturer schematics, “All-in-one Solar ESS” corresponds to RAIO and “Backup Gateway” corresponds to RAIO GATEWAY.

⚠	**NOTICE:** Do not rename firmware alarm IDs or manufacturer model numbers when documenting a service case. These identifiers are used for diagnostics and support.

Document Information

Rights and Permissions

The information in this manual is provided for the installation, operation, care, and support of BigBattery RAIO products. No part of this document may be reproduced for commercial distribution without authorization from BigBattery, LLC.

Latest Documents

For the latest RAIO documentation, product updates, and technical support information, contact BigBattery Support or visit BigBattery.com.

Warranty Information

RAIO is covered by a 12-year limited warranty. Warranty eligibility, remedies, exclusions, and claim requirements are governed by the applicable written BigBattery warranty terms. Learn more at BigBattery.com.

Safety Precautions

Read this document carefully before installing or using the equipment. Failure to follow the instructions or warnings may lead to equipment damage, electric shock, serious injury, or death.

Product Information

The system consists of the RAIO, RAIO GATEWAY, and other electrical components. This document applies to the RAIO and RAIO GATEWAY.

Product Improvement and Document Updates

BigBattery may improve the product and update this document without additional notice.

Image and Picture Usage

Images and diagrams are for demonstration only and may vary in detail from the actual product depending on product version.

Software Licenses

Do not reverse engineer, crack, or otherwise compromise firmware or software supplied with the system. Use software and firmware only as authorized.

Disposal of Scrapped Products

Scrapped products, including internal chemical and electrical materials, should not be disposed of as household waste. Follow applicable local laws and regulations for disposal.

Disclaimer:

BigBattery, LLC reserves the right to modify this content without prior notice. To access the latest manual version, please visit our website at www.bigbattery.com.

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1. Safety Statements

Important Information

Installation and servicing of the RAIO and RAIO GATEWAY involve high-voltage electricity and must be performed only by qualified or certified installers. BigBattery is not responsible for injury or property damage resulting from unqualified repair attempts or failure to follow the instructions in this manual.

Safety Symbols

DANGER	Indicates a high-level hazard that, if not avoided, could result in death or serious injury.
WARNING	Indicates a medium-level hazard that, if not avoided, could result in death or serious injury.
CAUTION	Indicates a low-level hazard that, if not avoided, could result in minor or moderate injury.
NOTICE	Indicates a device or environmental hazard that, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE addresses practices not related to personal injury.
ELECTRONIC DEVICE	Do not dispose of with household waste. Follow local laws and regulations for proper disposal of electrical and chemical materials.

The DANGER, WARNING, CAUTION, and NOTICE alerts supplement the safety instructions and do not cover every possible safety aspect.

General Information

- Read this entire document before installing or using the RAIO. Disregarding instructions and warnings can lead to electric shock, severe injury, death, or equipment damage.
- There is a risk of electric shock. DC conductors of connected PV systems are typically ungrounded but may intermittently ground without notice when the inverter checks PV array isolation. Always disconnect all power sources before servicing.
- The battery can pose risks of electric shock, fire, or explosion from vented gases. Take appropriate precautions.
- This product can expose you to chemicals such as cobalt and lithium compounds. In California, these are known to cause cancer and reproductive harm. For more information, visit www.P65Warnings.ca.gov. Exposure is not expected unless the casing is opened. Only approved technicians should open it.
- The RAIO must be installed only by certified installers who are licensed electricians.
- The RAIO is heavy. Use appropriate lifting equipment and safe material-handling practices.
- Use the RAIO only as instructed.
- Do not use the RAIO if it is defective, cracked, broken, damaged, or not functioning properly.
- Do not open, disassemble, repair, tamper with, or modify the RAIO. It is not user-serviceable, and its batteries are not user-replaceable. Contact Technical Support or the installer for repairs.
- Do not insert foreign objects into any part of the RAIO.
- Do not expose the RAIO or its components to an open flame.
- Do not install the RAIO near heating equipment.
- Do not immerse the RAIO or its components in water or other fluids.

General Information (continued)

- The RAIO is not designed or warranted for non-stationary use.
- Risk of electric shock. Do not remove the cover; there are no user-serviceable parts inside. Qualified personnel must perform servicing.
- This equipment may have both AC and DC voltage sources. Disconnect each circuit separately before servicing.
- Do not use cleaning solvents on the RAIO. Keep it away from flammable or harsh chemicals and vapors.
- Use only fluids, parts, and accessories specified for the system. Do not use non-genuine parts or accessories from uncertified sources.
- Do not store the RAIO for more than one month without following approved storage procedures. Do not allow its electrical feed to remain cut off for more than one month. Contact your installer for guidance.
- Do not paint any part of the RAIO, including internal or external components, shell, or casing.
- When installed in a garage or near vehicles, keep the RAIO out of the vehicle path. Where possible, install it on a side wall and/or above vehicle bumper height.

Environmental Conditions

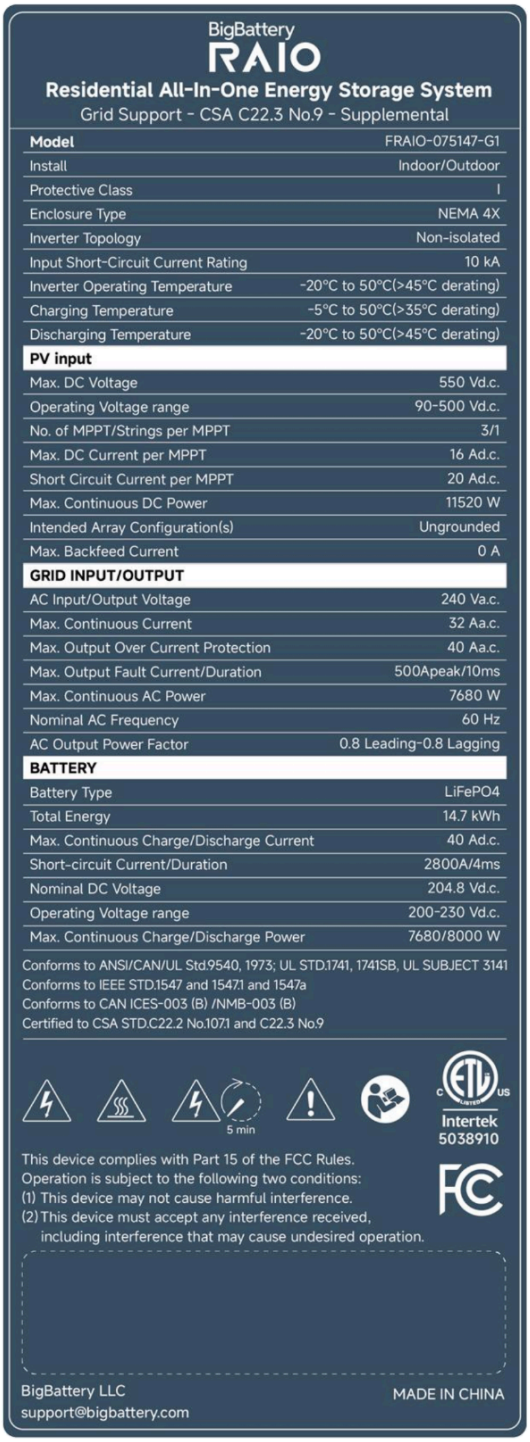
DANGER: Install the RAIO where it will not be damaged by flooding.

WARNING: Operating or storing the RAIO outside its specified temperature range can damage the product. Ensure that no water sources, such as downspouts, sprinklers, or faucets, are above or near the RAIO, and prevent snow accumulation around the unit.

2. Product Identification and Nameplate

The nameplate identifies the product and provides key details, including the manufacturer model, electrical ratings, safety certifications, and operational parameters needed for proper installation and safe use.

RAIO	RAIO GATEWAY
Name: BigBattery RAIO (Residential PV Energy Storage All-in-One) Manufacturer model decoding: RAIO - All-in-one 7.6K - Power (kW) A/S/T - Split-phase / Single-phase / Three-phase	Name: BigBattery RAIO GATEWAY Manufacturer model decoding: Gateway - Backup Gateway 200 - Current A/S/T - Split-phase / Single-phase / Three-phase



BigBattery
RAIO
Residential All-In-One Energy Storage System
Grid Support - CSA C22.3 No.9 - Supplemental

Model	FRAIO-075147-G1
Install	Indoor/Outdoor
Protective Class	I
Enclosure Type	NEMA 4X
Inverter Topology	Non-isolated
Input Short-Circuit Current Rating	10 kA
Inverter Operating Temperature	-20°C to 50°C(>45°C derating)
Charging Temperature	-5°C to 50°C(>35°C derating)
Discharging Temperature	-20°C to 50°C(>45°C derating)
PV input	
Max. DC Voltage	550 Vd.c.
Operating Voltage range	90-500 Vd.c.
No. of MPPT/Strings per MPPT	3/1
Max. DC Current per MPPT	16 Ad.c.
Short Circuit Current per MPPT	20 Ad.c.
Max. Continuous DC Power	11520 W
Intended Array Configuration(s)	Ungrounded
Max. Backfeed Current	0 A
GRID INPUT/OUTPUT	
AC Input/Output Voltage	240 Va.c.
Max. Continuous Current	32 Aa.c.
Max. Output Over Current Protection	40 Aa.c.
Max. Output Fault Current/Duration	500Apeak/10ms
Max. Continuous AC Power	7680 W
Nominal AC Frequency	60 Hz
AC Output Power Factor	0.8 Leading-0.8 Lagging
BATTERY	
Battery Type	LiFePO4
Total Energy	14.7 kWh
Max. Continuous Charge/Discharge Current	40 Ad.c.
Short-circuit Current/Duration	2800A/4ms
Nominal DC Voltage	204.8 Vd.c.
Operating Voltage range	200-230 Vd.c.
Max. Continuous Charge/Discharge Power	7680/8000 W

Conforms to ANSI/CAN/UL Std.9540, 1973; UL STD.1741, 1741SB, UL SUBJECT 3141
Conforms to IEEE STD.1547 and 1547.1 and 1547a
Conforms to CAN ICES-003 (B) /NMB-003 (B)
Certified to CSA STD.C22.2 No.107.1 and C22.3 No.9

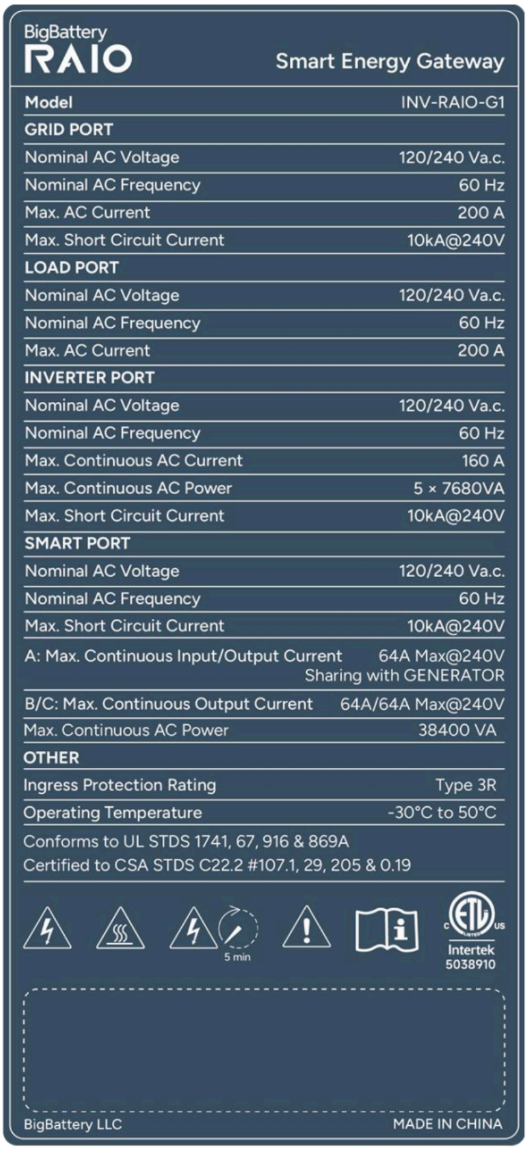
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This device complies with Part 15 of the FCC Rules.
Operation is subject to the following two conditions:
(1) This device may not cause harmful interference.
(2) This device must accept any interference received, including interference that may cause undesired operation.

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RAIO
Smart Energy Gateway

Model	INV-RAIO-G1
GRID PORT	
Nominal AC Voltage	120/240 Va.c.
Nominal AC Frequency	60 Hz
Max. AC Current	200 A
Max. Short Circuit Current	10kA@240V
LOAD PORT	
Nominal AC Voltage	120/240 Va.c.
Nominal AC Frequency	60 Hz
Max. AC Current	200 A
INVERTER PORT	
Nominal AC Voltage	120/240 Va.c.
Nominal AC Frequency	60 Hz
Max. Continuous AC Current	160 A
Max. Continuous AC Power	5 × 7680VA
Max. Short Circuit Current	10kA@240V
SMART PORT	
Nominal AC Voltage	120/240 Va.c.
Nominal AC Frequency	60 Hz
Max. Short Circuit Current	10kA@240V
A: Max. Continuous Input/Output Current	64A Max@240V Sharing with GENERATOR
B/C: Max. Continuous Output Current	64A/64A Max@240V
Max. Continuous AC Power	38400 VA
OTHER	
Ingress Protection Rating	Type 3R
Operating Temperature	-30°C to 50°C

Conforms to UL STDS 1741, 67, 916 & 869A
Certified to CSA STDS C22.2 #107.1, 29, 205 & 0.19

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Intertek
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Manufacturer Serial Number Structure

Every RAIO and RAIO GATEWAY has a unique serial number. The manufacturer serial-number format is shown below because it may be required for service identification.

9 | HR | C | 762 | G | US | C | 10 | 1 | 0001

Symbol	Type	Description
9	Business Unit	Solar
HR	Product	All-in-one Solar ESS / RAIO (HR: All-in-one Solar ESS; B1: Backup Gateway / RAIO GATEWAY)

Symbol	Type	Description
C	Phase	Split phase (A: Single phase; K: Three phase; C: Split phase)
762	Power Output	7.6 kW (762: 7.6 kW power output, HR; 20Y: 200 A with grading panel, B1)
G	Manufacturing Type	G: Production Unit; M: After-service; Y: Prototype
US	Shipping Destination	US: United States
C	Year	2025 (C: 2025; D: 2026; E: 2027; F: 2028)
10	Week	10th week (01: 1st week; 10: 10th week; 52: 52nd week)
1	Batch Number	1, 2, 3, ...
0001	Running Number	Unique running number

3. Care and Maintenance

Care and Cleaning

- Keep the area around the RAIO clear of foreign objects and debris for optimal airflow.
- Do not lean on, stack items on, or hang objects from the RAIO or its connecting wires and conduits.
- Clean the RAIO with a soft, lint-free cloth. If needed, dampen the cloth with mild soap and water only.
- Avoid cleaning solvents and keep the unit away from flammable or harsh chemicals and vapors.

Service

- Keep leaves and foreign materials away from the RAIO, especially from the top and the area between the unit and the back wall.
- Place the RAIO out of direct sunlight.
- Operate the system only in suitable temperature and humidity conditions.
- Clean the surface with a soft cloth lightly dampened with water only, and only when the equipment is completely de-energized.
- Keep the unit away from flammable, explosive, or poisonous materials.
- Operate the system within the allowed power range to avoid overloading.
- Ensure cables are securely wired and connectors are free of mechanical stress.
- Keep the installation away from hazardous areas and potential risks.
- If the RAIO is installed indoors, installing a smoke detector nearby is recommended.

Maintenance

- Check the system's running status in the mobile app. Contact qualified service personnel if an alarm is detected.
- Regularly verify that the physical power-button status matches the app setting.
- Do not attempt self-repair. Contact certified professionals.

4. System Overview

4.1 System Configuration

RAIO is an integrated solar and battery solution that stores energy generated by solar sources, converts energy from solar panels or a solar roof for household use, and supports solar self-consumption, load shifting, and off-grid applications. RAIO works with RAIO GATEWAY, which regulates the system connection to the utility grid and monitors home energy consumption.

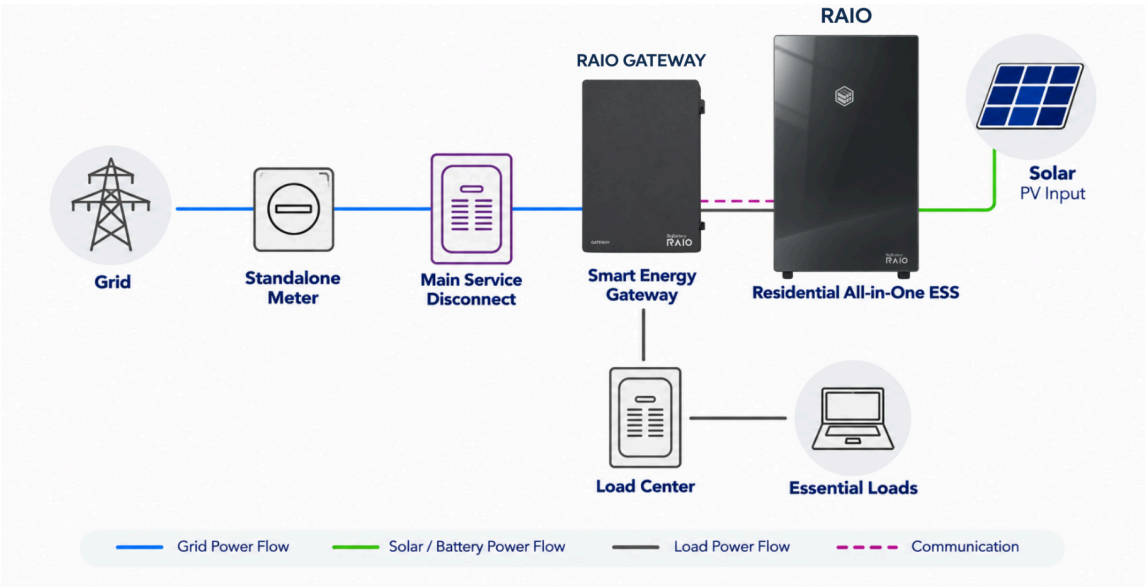
Whole Home Backup

For whole-home backup, the RAIO system stores energy from the grid or solar installation and can supply the entire household during a grid outage, helping keep home appliances and systems running.

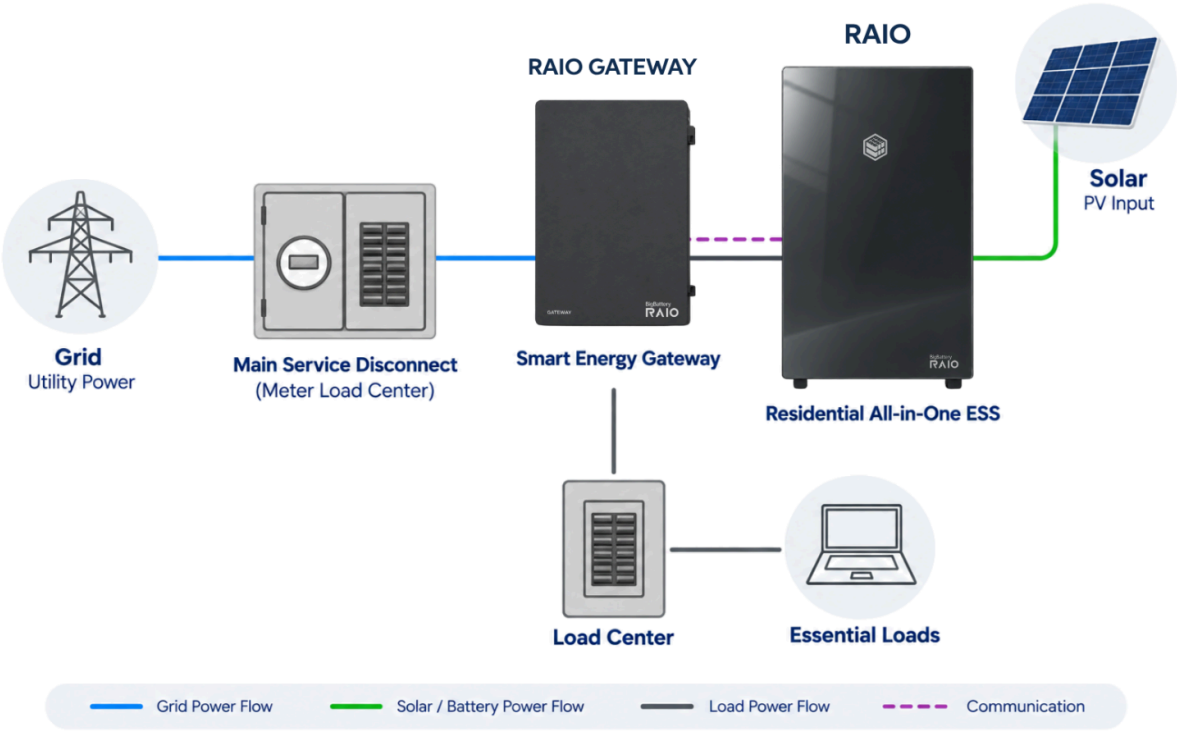
Partial Home Backup

For partial-home backup, the RAIO system stores energy from the grid or solar sources and powers pre-selected home loads during a grid outage. The selected loads are determined during system design, and the installer configures the system so non-selected loads are excluded from the backup scope.

4.1.1 Whole Home Backup System with Standalone Meter

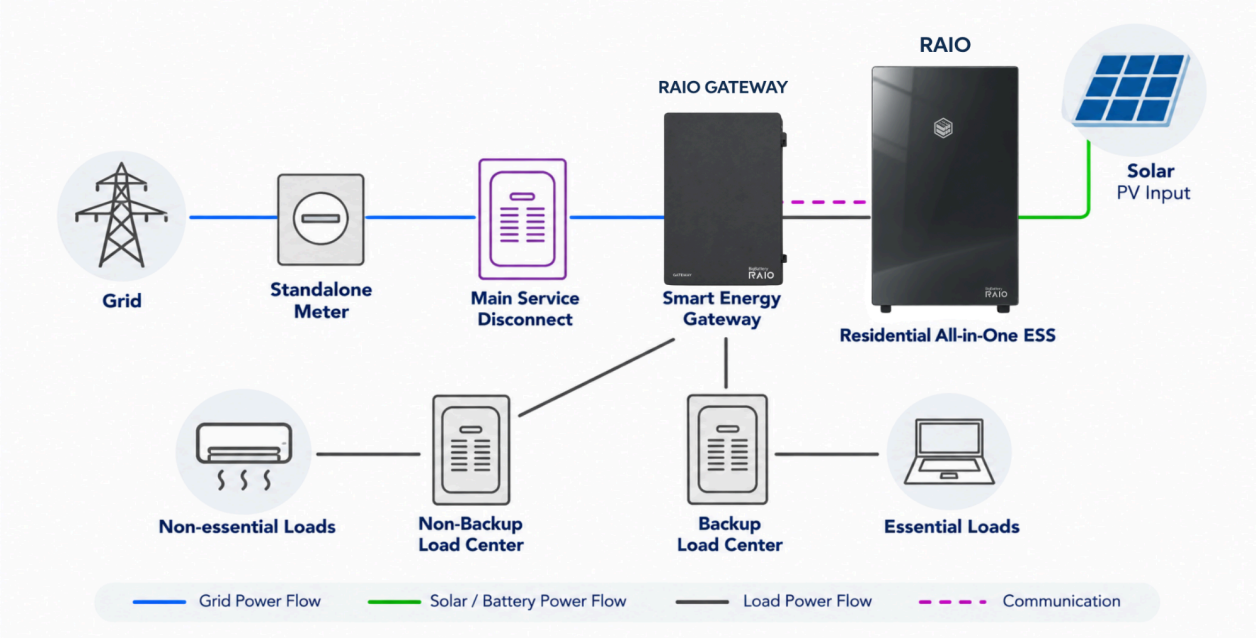


Whole Home Backup System with Meter Load Center

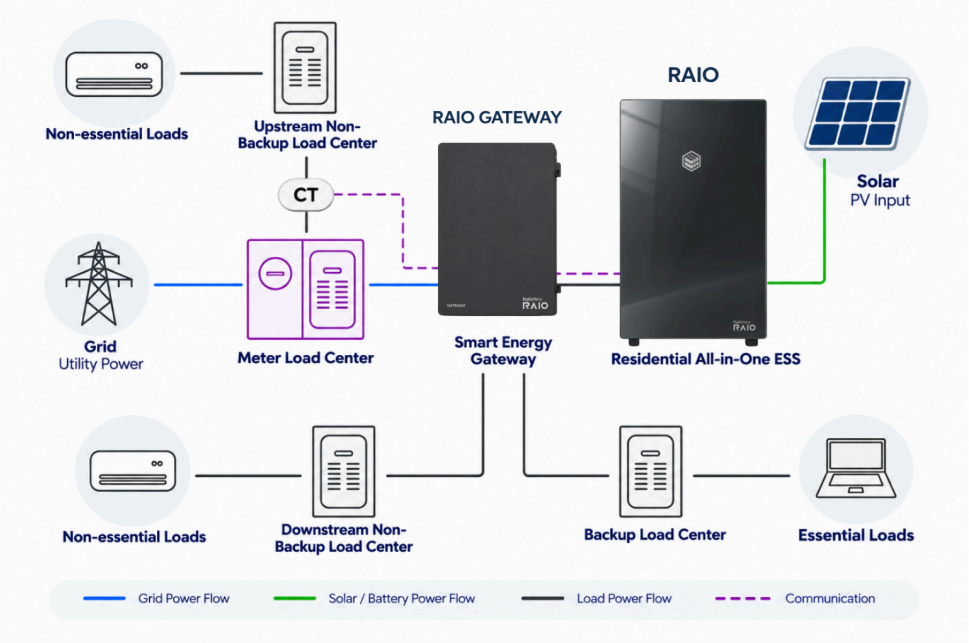


Manufacturer reference diagrams: whole-home backup configurations

4.1.2 Partial Home Backup System with Standalone Meter



Partial Home Backup System with Meter Load Center

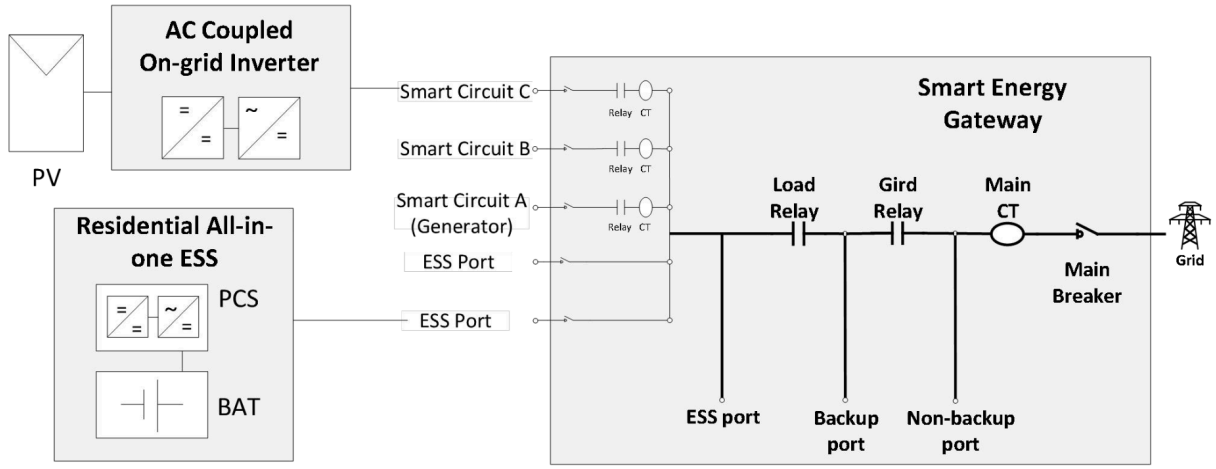


Manufacturer reference diagrams: partial-home backup configurations

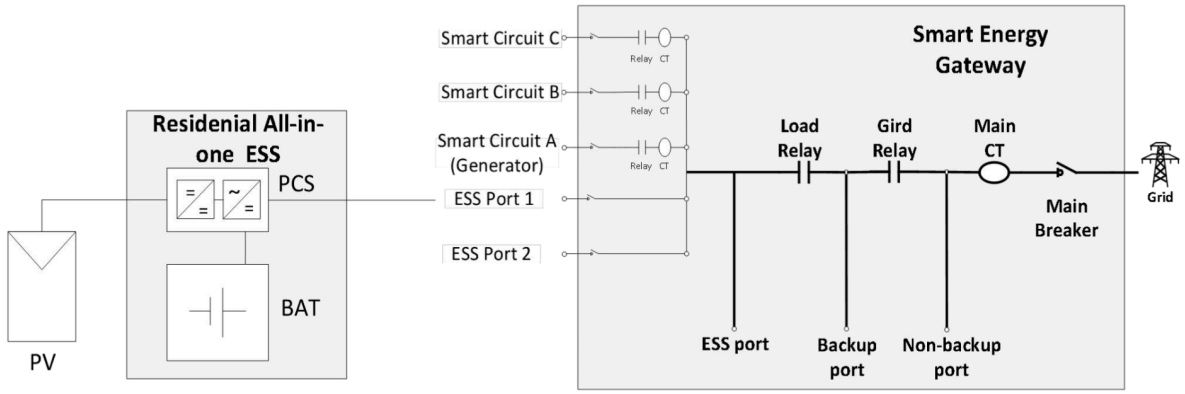
4.1.3 Integration

RAIO can be integrated as a hybrid-coupled or AC-coupled storage system. In the hybrid-coupled scheme, the battery is connected on the PV side but can also be charged from the AC supply. In the AC-coupled scheme, an on-grid inverter and RAIO are connected through RAIO GATEWAY, while RAIO operates without a direct PV connection.

AC Coupled Scheme



Hybrid Coupled Scheme



The battery is connected on the PV side but can be charged from the AC supply.

Hybrid-coupled and AC-coupled reference schemes

An AC-coupled on-grid inverter and the RAIO (Residential All-in-One) energy storage system (ESS) are connected to the RAIO GATEWAY (Smart Energy Gateway). The RAIO, which is not connected to any PV panels, operates in AC-coupled mode.

4.2 Parts of the System

4.2.1 Part Description

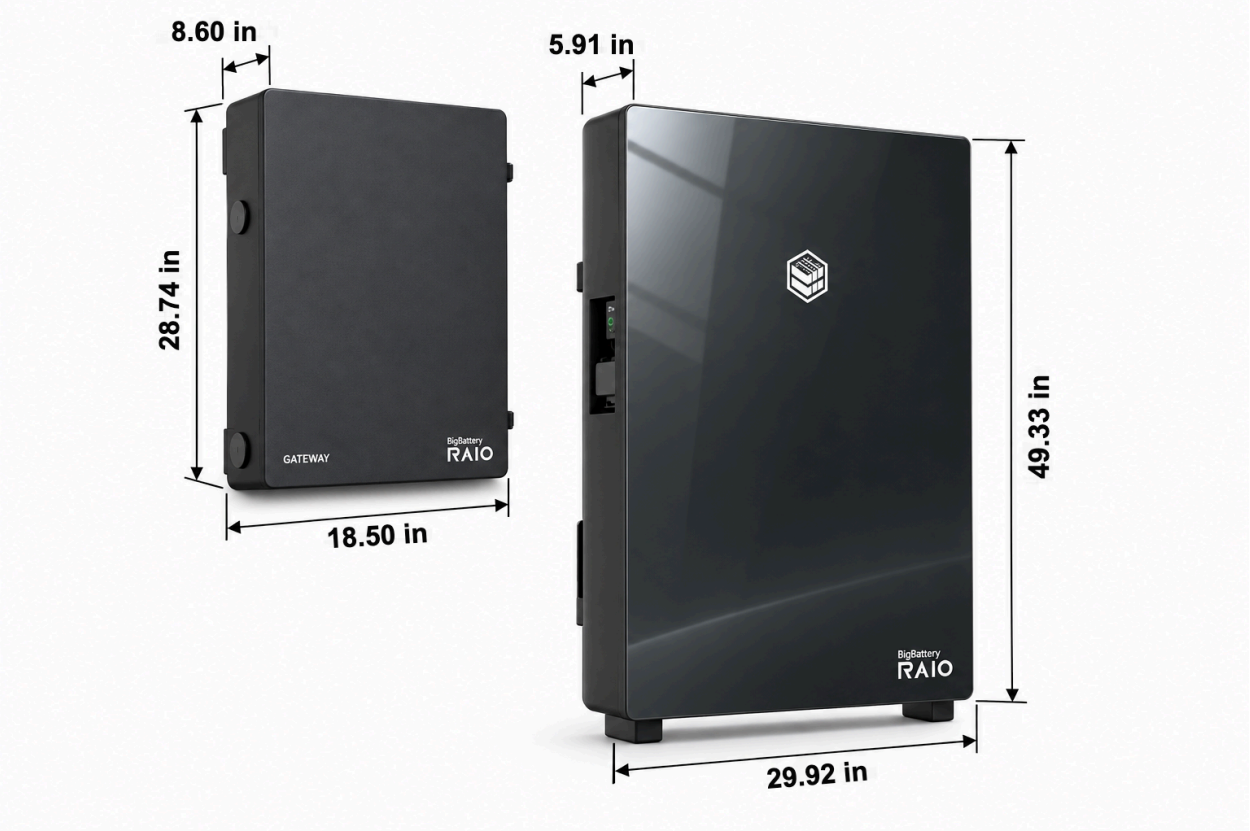
Part	Description
RAIO (Residential All-in-One ESS)	Integrated system combining solar power conversion and battery storage. It converts energy from solar panels or a solar roof for household use and stores surplus energy for later consumption.
RAIO GATEWAY	Power-distribution and automatic-transfer unit that controls power flow using internal relays and software.
Data Logger	Purpose-built device that connects RAIO to the internet and presents key information, including PV power, State of Charge (SOC), load power, and working mode.

4.2.2 Dimensions

Part	Height	Width	Depth
RAIO ESS Battery	49.33 in*	29.92 in	5.91 in
RAIO GATEWAY	28.74 in	18.50 in	8.60 in

** RAIO height excludes fixed feet.*

4.2.3 Measurements

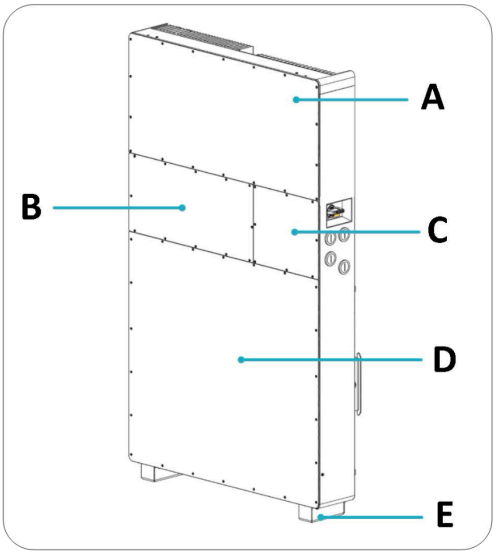


RAIO and RAIO GATEWAY dimensional reference

4.3 Features

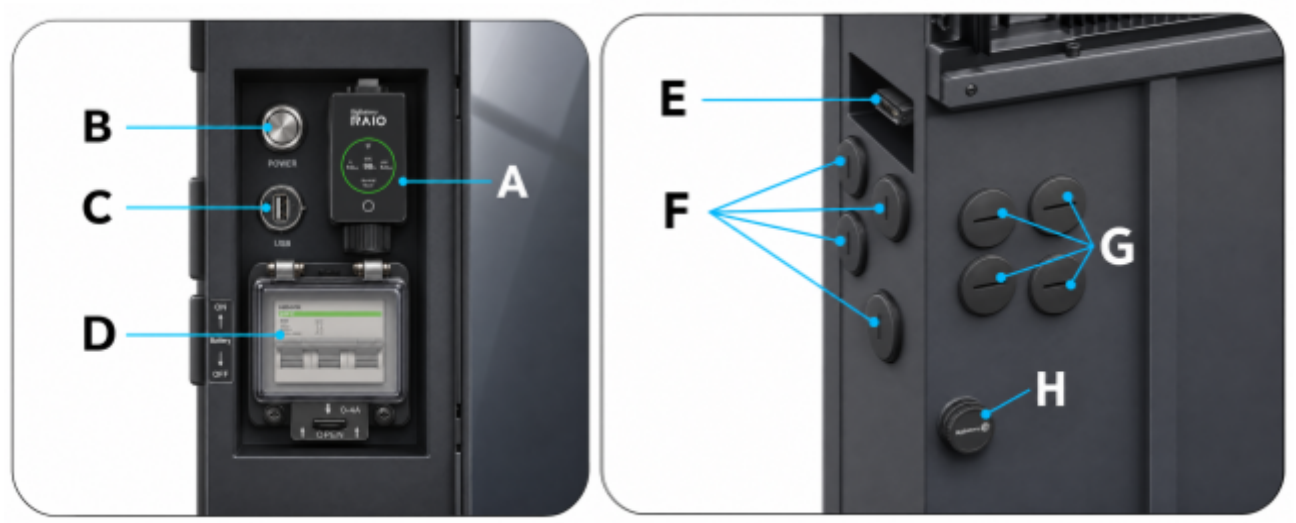
4.3.1 RAIO (Residential All-in-One)

RAIO integrates solar power generation and battery storage. It converts energy produced by solar panels or a solar roof for household use and stores surplus energy for later use.



Item	Name	Description
A	Power Conversion System (PCS)	Bidirectional conversion between DC and AC
B	Battery Control Unit (BCU)	Monitors, manages, and safeguards battery charging and discharging
C	Wiring Cabinet	Electrical distribution cabinet integrating wiring, circuit breakers, and protection devices
D	Battery Pack	Physical energy storage unit
E	Fixed Feet	Mounting feet for equipment stability

RAIO Interface and Controls



Item	Name	Description
A	Data Logger	Pairing and network communication
B	Battery Button	BMS startup control
C	USB port	Physical slot for updates
D	Circuit breaker	Physical energy storage unit
E	DC switch	Mounting feet for equipment stability

Battery Button

- Power-on: Long-press for 3 seconds. Release after the green LED turns on.
- Power-off: Long-press for 5 seconds until the LED turns off, then release.
- When a fault exists, the LED flashes once every second. The LED stays on continuously while the button is pressed.

Data Logger



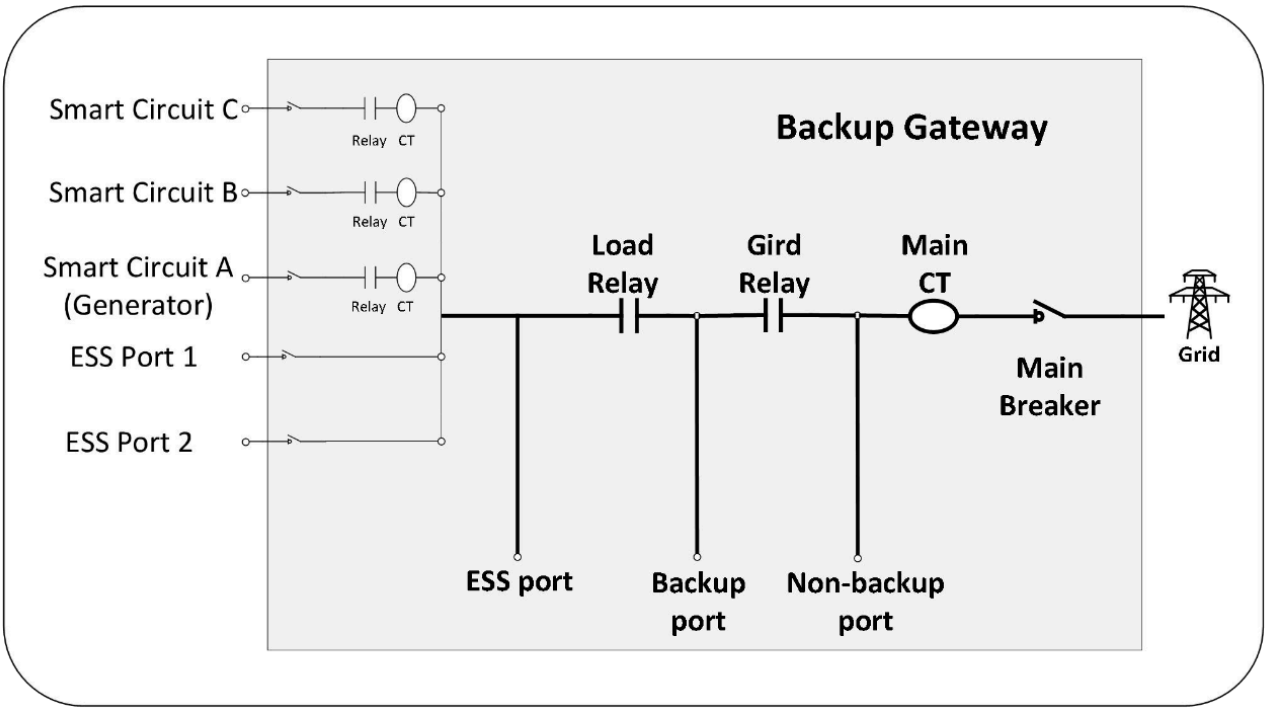
The Data Logger connects the RAIO system to the internet and presents key information to users. Its integrated LED display and wake-up touch button allow convenient monitoring of PV power, State of Charge (SOC), load power, and the system's working mode.

The Data Logger supports a wired LAN connection using Cat5e cable or a wireless connection through 2.4 GHz Wi-Fi. For reliable operation, configure the Data Logger using the Service App before use.

Insert and lock the Data Logger firmly into the USB port of the RAIO.

4.3.2 RAIO GATEWAY

RAIO GATEWAY is an automatic transfer switch that transfers home loads in the solar and battery system from on-grid power to off-grid power during a grid outage. As a critical component of a utility-connected energy storage system, it prevents dangerous back-feed into utility electrical lines.



Manufacturer reference: RAIO GATEWAY power-flow architecture

Item	Description
Smart circuit A	Controlled by a relay and monitored by a current sensor (CT); dedicated to connecting a generator.
Smart circuit B	Controlled by a relay and monitored by a current sensor (CT).
Smart circuit C	Controlled by a relay and monitored by a current sensor (CT); dedicated to connecting an AC-coupled on-grid inverter.
ESS input 1	Connects to ESS power; capable of withstanding a maximum current of 40 A.
ESS input 2	Connects to ESS power; capable of withstanding a maximum current of 40 A.
ESS port	Connects to the sub-panel that distributes power to additional ESS units.
Backup port	Connects to the distribution panel for backup loads.
Non-backup port	Connects to the distribution panel for non-backup loads.
Grid Relay	Manually or automatically disconnects the system from the utility grid to form a microgrid; typically triggered by an outage or user command.
Load Relay	Separates ESS and smart loads from backup loads; typically triggered by black start.
Main CT	Measures current flow into and out of RAIO GATEWAY.

Grid Relay and Load Relay

The grid relay and load relay are electrically operated switches that control the flow of high current in the circuit.

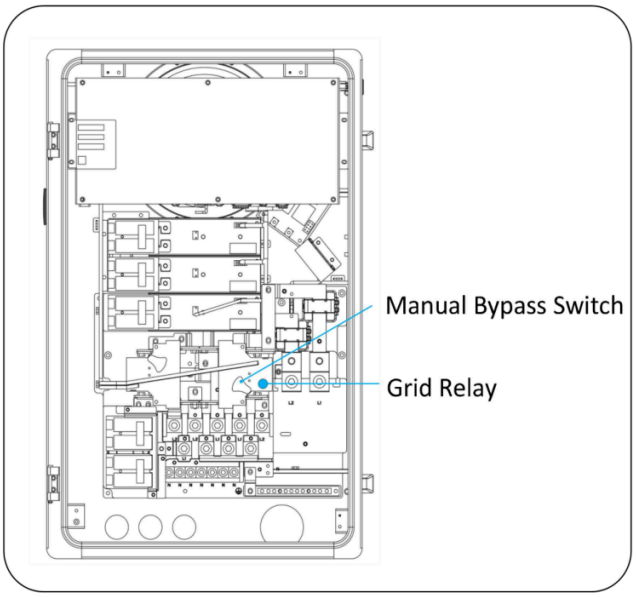
Event	Load Relay	Grid Relay	Description
Normal	Closed	Closed	Allows power to supply the backup loads.
Power outage / manual trigger	Closed	Open	Grid relay opens to disconnect RAIO GATEWAY from the grid, preventing abnormal voltage feedback.
Black Start	Briefly open, then closed	Open	Load relay briefly opens to avoid startup-current surges that could disrupt ESS or generator initialization.
EPO	Open	Open	If the EPO button is pressed, both relays quickly open.

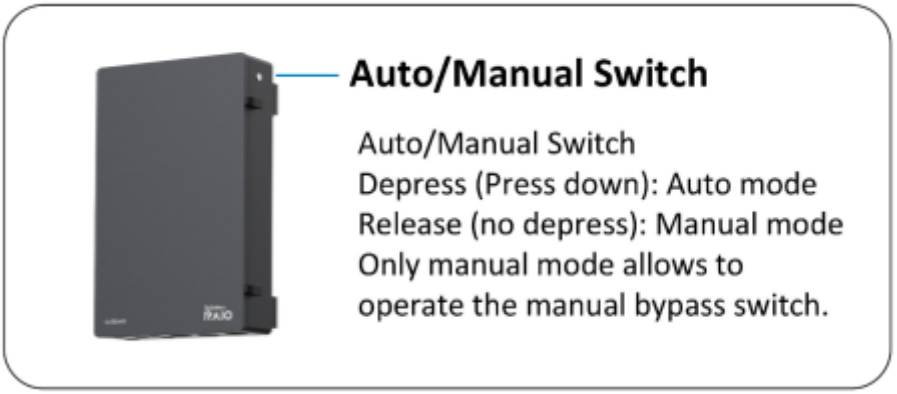
Manual Bypass Switch (Grid Relay)

The manual bypass switch on the relay can provide complete electrical power during installation, commissioning, or maintenance of the system.

	**DANGER:** Before using the manual bypass switch, press the EPO switch, turn the grid breaker and RAIO breaker to OFF, and wait until no RAIO GATEWAY LEDs indicate power.

Manual Bypass Procedure





Manufacturer reference: manual bypass switch and Auto/Manual control

To safeguard equipment and safely bypass RAIO GATEWAY, use the following sequence. During restart, allow RAIO GATEWAY to auto-reset the manual bypass switch; do not manually reset it during the restart sequence.

1. Ensure the Auto/Manual switch on RAIO GATEWAY is released (not pressed down).
2. At the main service panel, turn the breaker connecting the grid to RAIO GATEWAY to OFF.
3. Long-press the RAIO battery button for 5 seconds to turn off the battery, then turn the battery DC breaker to OFF.
4. At the RAIO GATEWAY, turn the grid breaker and ESS breakers to OFF.
5. Remove the protective cover if necessary, and set the grid-relay bypass switch to GRID.
6. Turn the ESS breaker to ON.
7. Turn the grid breaker to ON.
8. Power on RAIO by long-pressing the battery button for 3 seconds, then turn the battery DC breaker to ON.
9. At the main service panel, turn the 2-pole breaker connecting the grid to RAIO GATEWAY to ON.

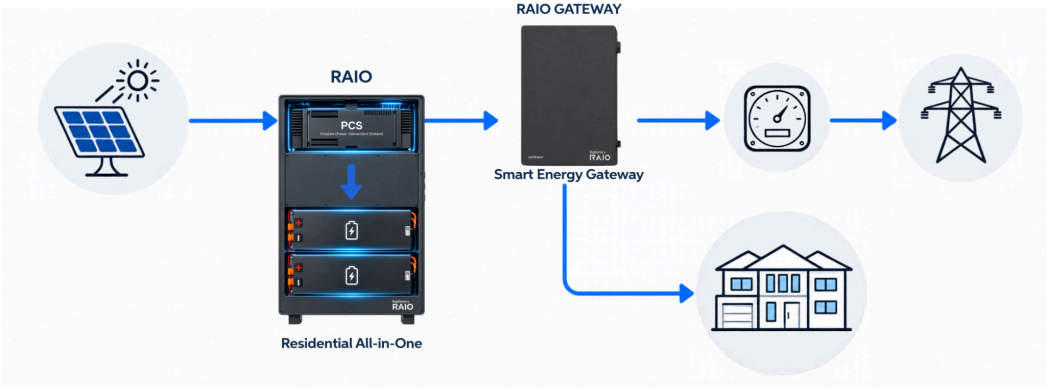
RAIO GATEWAY will route AC power from the grid terminals to the load terminals until the bypass procedure is reversed.

4.4 Working Modes

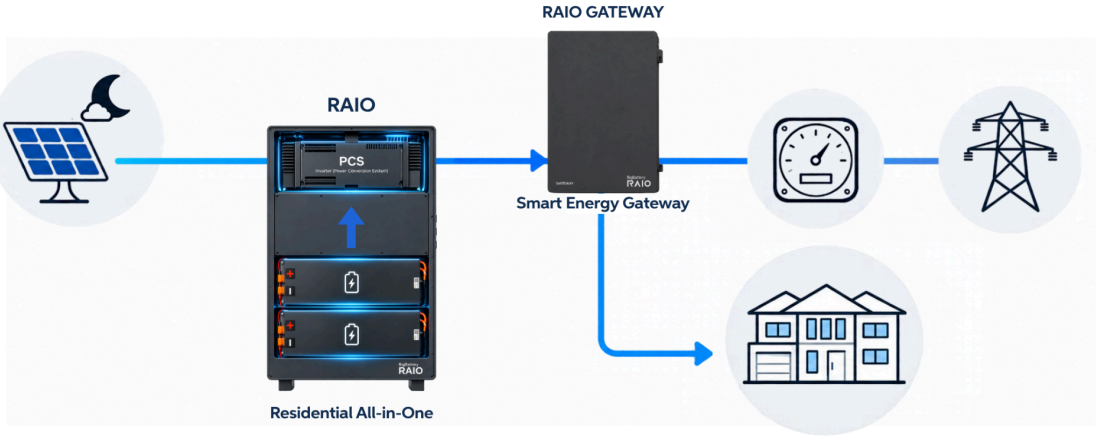
4.4.1 Self-Use Mode

This mode prioritizes PV power for local loads, then draws on the batteries, and finally the grid if needed. It is ideal for areas with low feed-in tariffs and high electricity prices, helping users reduce bills and maximize solar self-consumption.

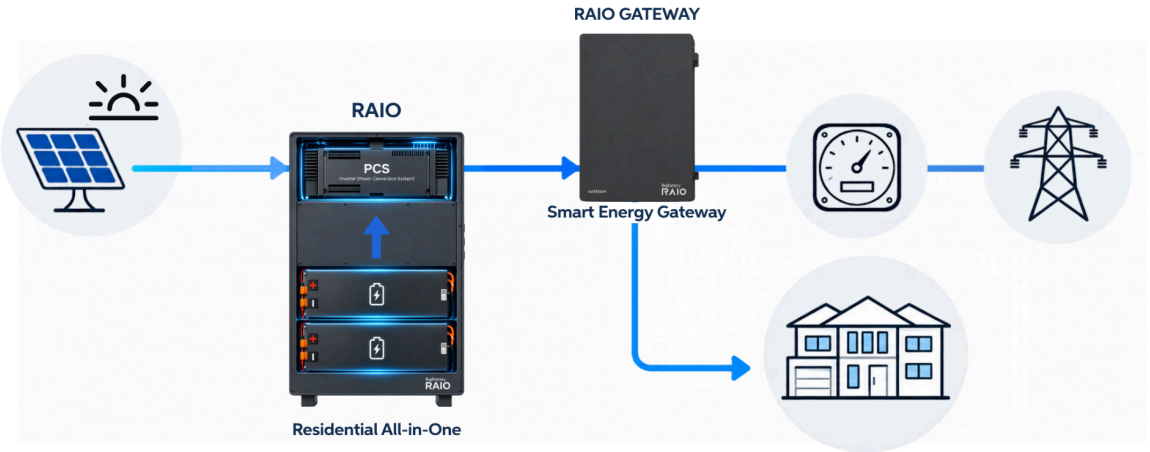
Scenario A: When PV power is sufficient, it first supplies household loads, then charges the ESS batteries, and any excess is sold to the grid.



Scenario B: When PV power is insufficient but battery power is adequate, the batteries supply loads, avoiding grid purchases.



Scenario C: When PV power is insufficient, the batteries supply loads until their charge is low, and then grid power is used.



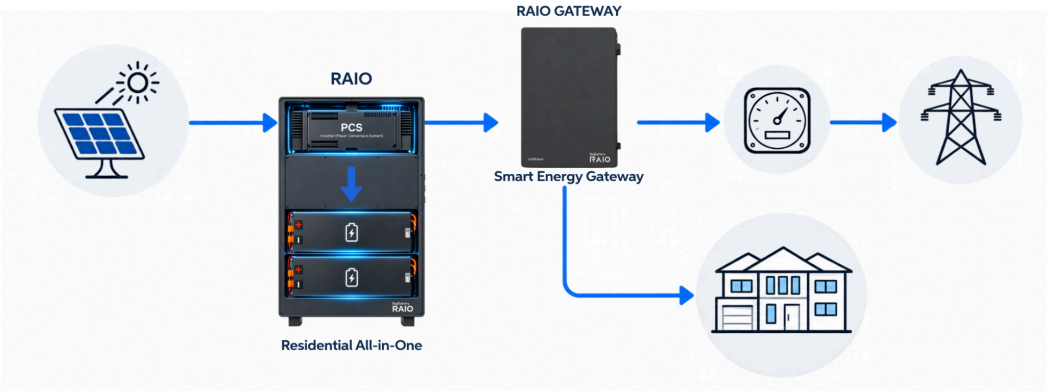
Self-Use mode operating scenarios

4.4.2 Feed-in Priority Mode

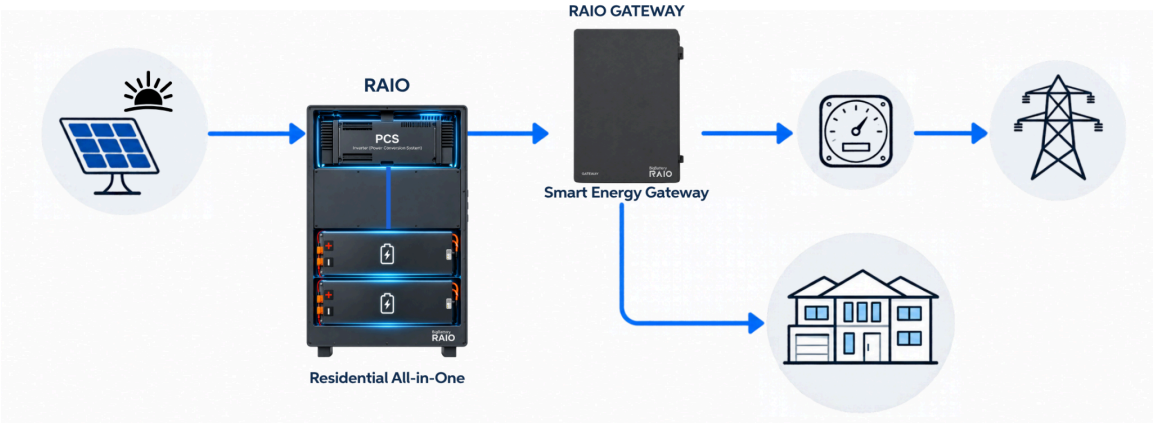
Feed-in Priority mode maximizes grid feed-in power after local load needs are met. PV power first supplies local loads; excess PV power is exported to the grid. When PV is insufficient, the system uses battery storage or grid power to cover the shortfall.

Feed-in Priority mode operating scenarios

Scenario A: When PV power is sufficient, it first powers loads, then feeds surplus power to the grid, and finally charges the battery.



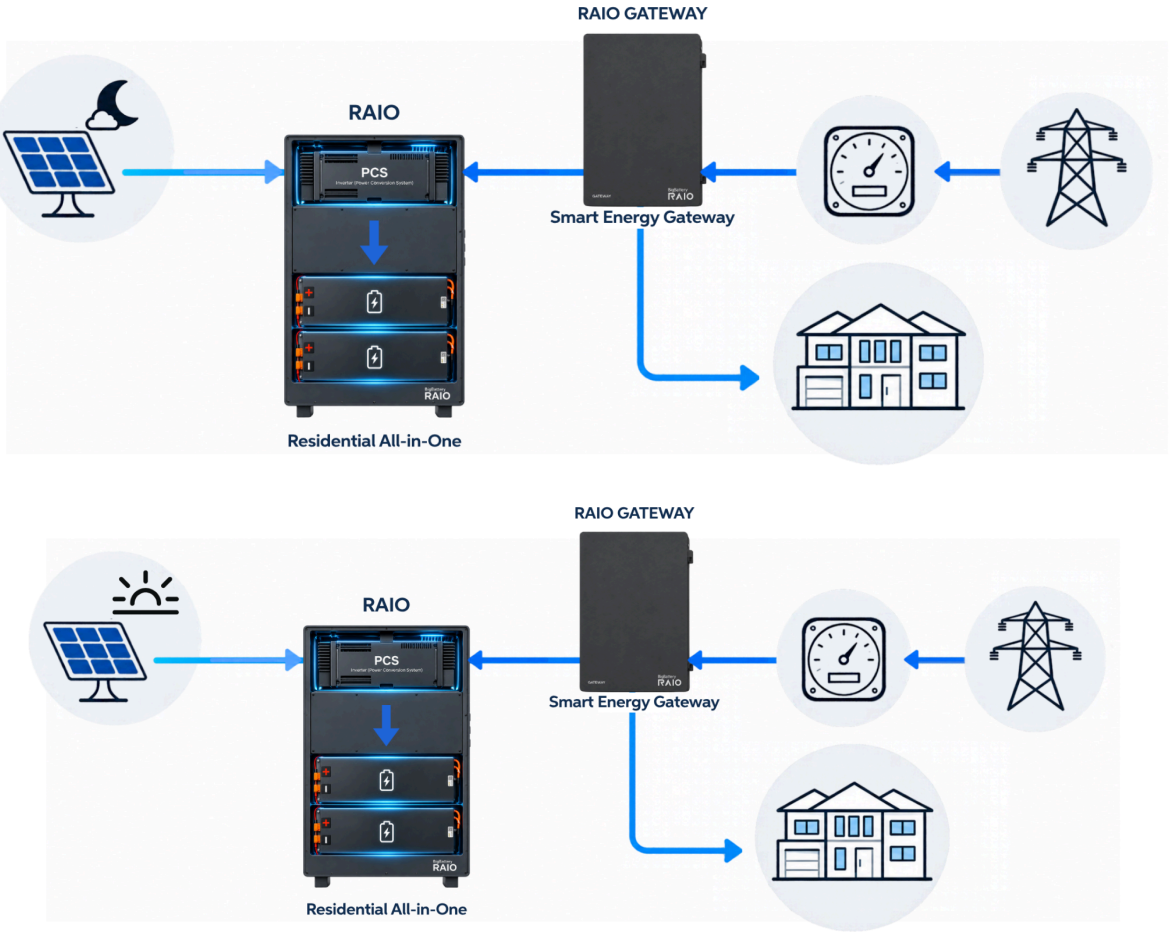
Scenario B: When PV power is insufficient, it prioritizes local loads; any remainder is fed to the grid, leaving no surplus for battery charging.



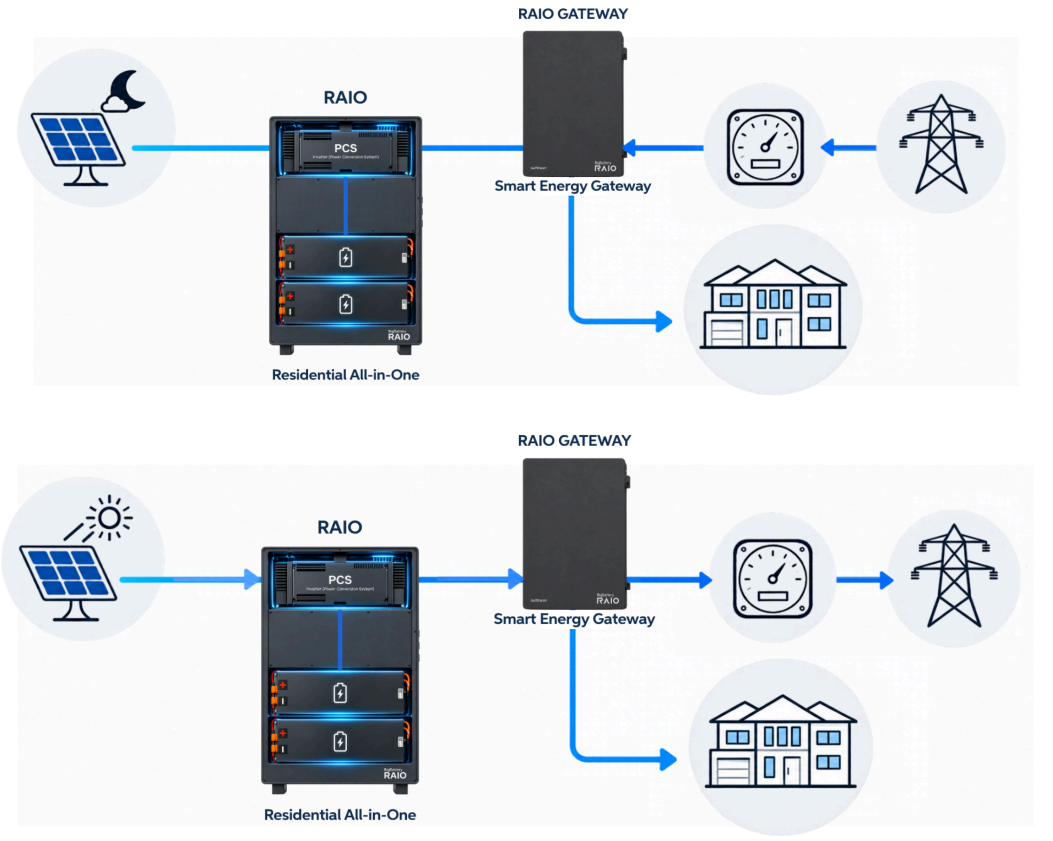
4.4.3 Backup Mode

Backup mode is available when RAIO GATEWAY is installed. It manages the battery reserve to maximize backup energy during outages and charges only at preset times. While the grid is on, the battery does not discharge in this mode.

Scenario A: During the charging period, if PV power is insufficient, both PV and the grid prioritize battery charging, while loads are powered by the grid.



Scenario B: Outside the charging period, the battery does not discharge.

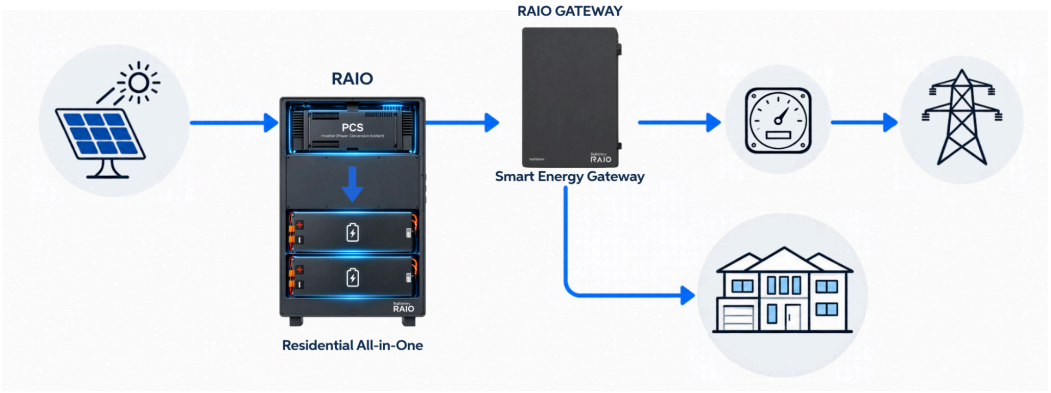


Backup mode operating scenarios

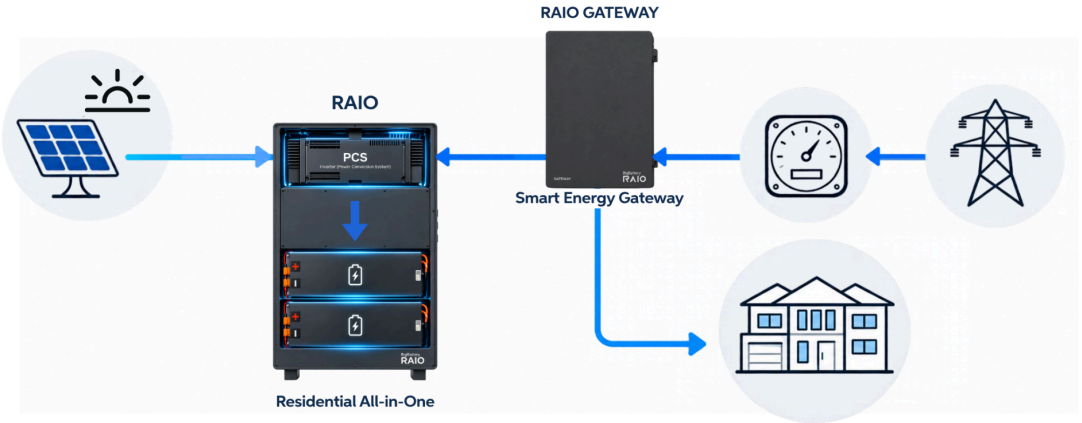
4.4.4 Time of Use (TOU) Mode

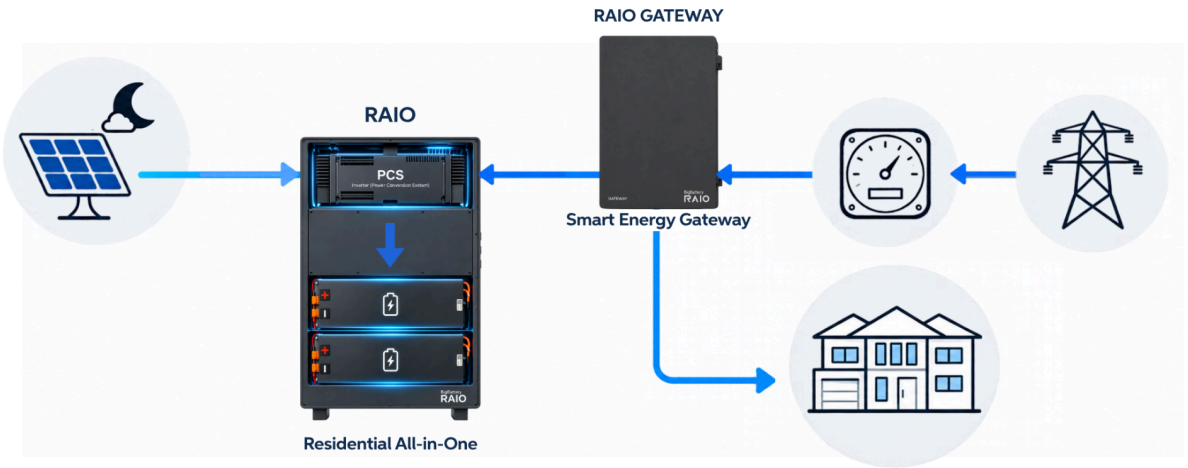
Time of Use mode controls when the grid is used to charge the battery. It optimizes energy use based on time-of-use tariffs by prioritizing local loads and scheduled battery charging, helping users leverage tariff differences to reduce costs and improve efficiency.

Scenario A: During the charging period, abundant PV energy first powers loads, then charges the battery, and any remaining energy is fed to the grid.

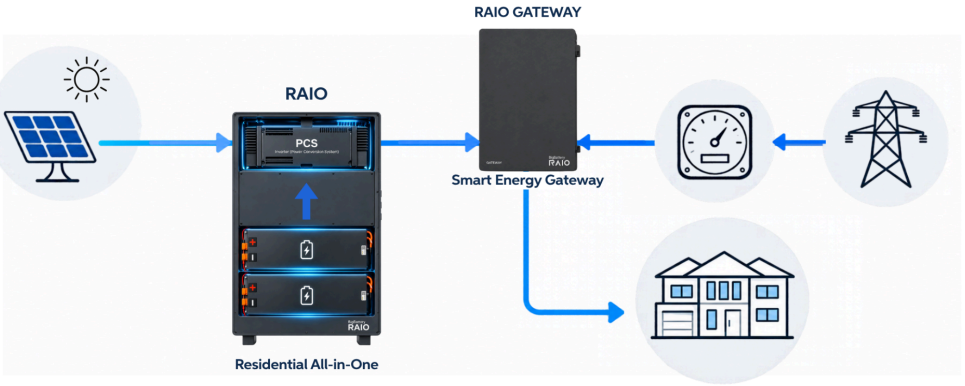


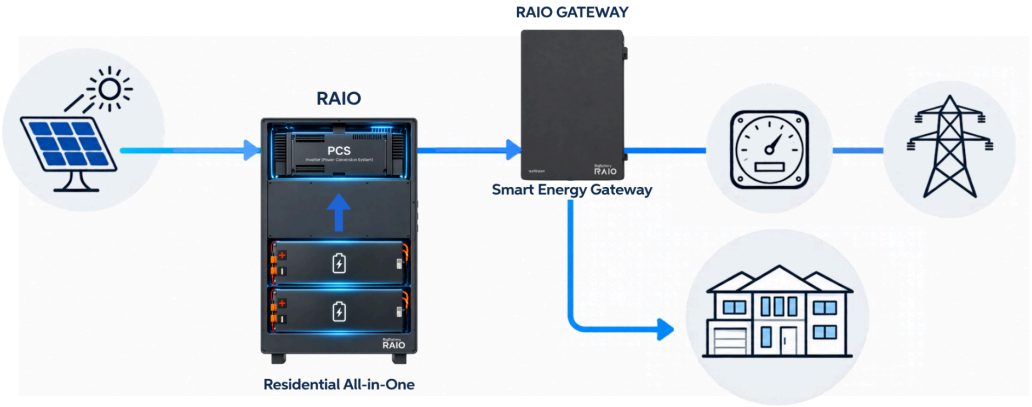
Scenario B: During the charging period, if PV power is insufficient, both PV and the grid prioritize battery charging, while loads are powered directly by the grid.





Scenario C: During the discharging period (Day & Night), the system operates in Self-Use mode.





5. Operation of the System

5.1 Diagnosing and Fixing Issues

If a fault persists after you follow the troubleshooting guidance, contact your installer, dealer, or BigBattery Technical Support. To expedite diagnosis, gather the following information before requesting service:

- Details of RAIO and RAIO GATEWAY: serial numbers, software versions, installation dates, the precise time the fault occurred, and how often it recurs.
- Installation environment data: weather conditions at the time of the fault, whether PV modules are shaded, and photos or videos of the installation site.
- Utility grid status: relevant information about the condition of the utility grid.

> ⚠ **NOTICE:** Alarm IDs and alarm names in the troubleshooting tables are retained exactly as shown by the manufacturer firmware. Record them as shown when contacting support.

Alarm ID	Alarm Name	Level	Cause	Suggested Solution
1	OCP Fault	Protection	Sudden power changes can cause transient current to exceed a certain threshold.	1. Wait for a short period of time. 2. Disconnect the AC and DC power supplies, then reconnect them.

Troubleshooting table - first entry

Troubleshooting Table (continued)

Alarm ID	Alarm Name	Level	Cause	Suggested Solution
				3. If the fault still persists, please contact the customer service department for handling.
2	Grid Lost Warning	Alert	Power grid outage or AC power supply disconnection.	1. Once the power grid resumes power supply, the alarm will automatically disappear. Check whether the AC circuit or AC switch is disconnected. 2. If the fault still persists, please contact customer service for handling.
3	BatCurrentImbalance Fault	Protection	A fault occurs in the battery charging section.	1. If it occurs occasionally, try turning off the power supply and then turning it back on to solve the problem. 2. If the fault still persists, please contact the customer service department for handling.
4	EPS PLL Over Time Fault	Protection	The inconsistency between the PCS and Gateway off-grid modes exceeds the predetermined time.	1. Check whether the operating modes of Gateway and the main PCS are both off-grid modes. 2. Turn off the power supply, then turn it back on and wait for the fault to clear. 3. If the fault still persists, please contact the customer service department for handling.
6	InvOverVoltFault	Protection	The PCS output voltage exceeds the threshold.	1. The firmware of components needs to be updated to maintain consistency. 2. If the fault still persists, please contact customer service for handling.

Troubleshooting Table (continued)

Alarm ID	Alarm Name	Level	Cause	Suggested Solution
7	EPS Sync Lost	Protection	Failure to capture the synchronization signal.	1. Turn off the power supply, then turn it back on and wait for the fault to clear. 2. If the fault still persists, please contact the customer service department for handling.
8	Under Temp Fault	Protection	The operating temperature is lower than the minimum threshold (-25℃).	1. If it occurs occasionally, try turning off the power supply and then turning it back on to solve the problem. 2. If the fault still persists, please contact the customer service department for handling.
9	GridUnderVoltFault	Protection	The grid voltage is lower than the allowable range, or the duration of the low-voltage state exceeds the preset under-voltage ride-through threshold.	1. If it occurs occasionally, it may be a short-term grid anomaly. The PCS will resume normal operation once it detects that the grid is normal, without the need for manual intervention. 2. If it occurs frequently, please check whether the grid voltage is within the allowable range.
10	GridOverVoltFault	Protection	The grid voltage is higher than the allowable range, or the duration of the high-voltage state exceeds the preset over-voltage ride-through threshold.	1. If it occurs occasionally, it may be a short-term grid anomaly. The PCS will resume normal operation once it detects that the grid is normal, without the need for manual intervention. 2. If it occurs frequently, please check whether the grid voltage is within the allowable range.
11	GridUnderFreqFault	Protection	The grid frequency is lower than the	1. If it occurs occasionally, it may be a short-term

Troubleshooting Table (continued)

Alarm ID	Alarm Name	Level	Cause	Suggested Solution
			allowable range, or the duration of low-frequency operation exceeds the preset under-voltage ride-through threshold.	grid anomaly. The PCS will resume normal operation once it detects that the grid is normal, without the need for manual intervention. 2. If it occurs frequently, please check whether the grid voltage is within the allowable range.
12	GridOverFreqFault	Protection	The grid frequency is higher than the allowable range, or the duration of high-frequency operation exceeds the preset high-frequency ride-through threshold.	1. If it occurs occasionally, it may be a short-term grid anomaly. The PCS will resume normal operation once it detects that the grid is normal, without the need for manual intervention. 2. If it occurs frequently, please check whether the grid voltage is within the allowable range.
13	PV Volt Fault	Protection	The photovoltaic voltage exceeds the threshold.	1. Reduce the photovoltaic voltage. 2. If the fault persists, please contact the customer service department for handling.
14	Bus Volt Fault	Protection	The voltage component exceeds the threshold.	1. Turn off the power supply, then turn it on again and wait for the fault to clear. 2. If the fault persists, please contact the customer service department for handling.
15	Bat Volt Fault	Protection	The battery voltage is too high or too low.	1. Check whether the battery voltage is within the allowable range. 2. If the fault persists, please contact the customer service department for handling

Troubleshooting Table (continued)

Alarm ID	Alarm Name	Level	Cause	Suggested Solution
17	DCI OCP Fault	Protection	The DC component of the current exceeds the threshold.	1. Turn off the power supply, then turn it on again and wait for the fault to clear. 2. If the fault persists, please contact the customer service department for handling.
18	DCV OVP Fault	Protection	The DC component of the voltage exceeds the threshold.	1. Turn off the power supply, then turn it on again and wait for the fault to clear. 2. If the fault persists, please contact the customer service department for handling.
19	SW OCP Fault	Protection	The battery charge-discharge over-current, PV over-current, or PCS over-current exceeds the predetermined threshold.	1. Turn off the power supply, then turn it on again and wait for the fault to clear. 2. If the fault persists, please contact the customer service department for handling.
20	RC OCP Fault	Protection	During the PCS operation, the insulation impedance of the PV input to ground decreases.	1. If it occurs occasionally, it may be due to occasional anomalies in the external circuit. After the fault is eliminated, the PCS will resume normal operation without the need for frequent manual intervention. 2. If the fault persists for a long time, please check whether the insulation impedance of the PV string to ground is too low.
21	Isolation Fault	Protection	Insulation impedance is lower than the threshold.	1. Turn off the power supply, then turn it on again and wait for the fault to clear.

Troubleshooting Table (continued)

Alarm ID	Alarm Name	Level	Cause	Suggested Solution
				2. If the fault persists, please contact the customer service department for handling.
22	Over Temp Fault	Protection	Operating temperature exceeds a certain threshold (95℃).	1. If it occurs occasionally, try turning off the power supply, wait for the equipmemt decrease to the normal temperature (25℃), and then turning it on again. 2. If the fault persists, please contact the customer service department for handling.
25	EPS Overload Fault	Protection	During off-grid operation, the load power exceeds the allowable range.	1. Check the total load power and remove some non-essential loads. 2. If the fault persists, please contact the customer service department for handling.
26	Parallel CAN Com Warning	Alarm	In paralleled connections of multiple All-in-one solar ESS units, the CAN communication connection between the master unit and the slave unit is abnormal.	1. Check whether communication cable in paralled connection of multiple All-in-one solar ESS units is correctly connected and check whether the RJ45 crystal head connector is loose. 2. Check whether the parallel settings are correct. 3. If the fault persists, please contact the customer service department for handling.
27	Gateway Can Com Fault	Protection	In the system, the CAN communication connection fails between the Backup Gateway and the	1. Check whether the communication cable is correctly connected or if the RJ45 crystal head connector is loose. 2. If the fault still persists,

Troubleshooting Table (continued)

Alarm ID	Alarm Name	Level	Cause	Suggested Solution
			All-in-one solar ESS.	please contact the customer service department for handling.
28	Off grid Battery Low Energy Warning	Alarm	When operating off-grid, if the battery power is lower than the threshold	1. Recharge the battery. 2. Reduce the load power. 3. If the fault still persists, please contact customer service for handling.
29	Parallel Cfg Fault	Protection	In the paralleling system, the parameter settings do not conform to the rules.	1. Check whether the parameter settings of the master-slave inverters in the paralleling system comply with the rules, especially that the paralleling roles should not be duplicated. 2. If the fault still persists, please contact the customer service department for handling.
30	Arc Detect Fault	Protection	An arc occurs in the system.	1. If it occurs occasionally, try turning off the power supply and then turning it on again to repair. 2. If the fault still persists, please contact customer service for assistance.
31	Arm Sci Com Fault	Protection	Communication Abnormality between Communication Board and Control Board	1. Check if the control board is powered on. 2. Check if the cable connecting the control board and the communication board is firmly plugged in. 3. If the fault still exists, please contact customer service for assistance.
34	Fan Fault	Protection	The fan may be	1. Turn off the power

Troubleshooting Table (continued)

Alarm ID	Alarm Name	Level	Cause	Suggested Solution
			damaged.	supply, then turn it on again and wait for the fault to clear. 2. If the fault persists, please contact the customer service department for handling.
36	Inv EEPROM Fault	Protection	E2PROM Read-write failure	1. Turn off the power supply, then turn it on again and wait for the fault to clear. 2. If the fault persists, please contact the customer service department for handling.
37	RCD Fault	Protection	Abnormal PCS Leakage Current	1. Turn off the power supply, then turn it back on and wait for the fault to clear. 2. If the fault persists, please contact the customer service department for handling.
39	Grid Relay Fault	Protection	The relay may be damaged.	1. Turn off the power supply, then turn it on again and wait for the fault to clear. 2. If the fault persists, please contact the customer service department for handling.
40	OtherDeviceFault	Protection	PCS hardware failures excluding relay, fan, E2PROM	1. Turn off the power supply, then turn it on again and wait for the fault to clear. 2. If the fault persists, please contact the customer service department for handling.
44	AFD Self Check Fault	Protection	The arc self-inspection	1. If it occurs occasionally, try turning off the power

Troubleshooting Table (continued)

Alarm ID	Alarm Name	Level	Cause	Suggested Solution
			module is not working properly.	supply and then turning it back on to solve the problem. 2. If the fault persists, please contact the customer service department for handling.
45	Sample Fault	Protection	Grid frequency or Gird voltage sampling fault.	1. Turn off the power supply, then turn it back on and wait for the fault to clear. 2. If the fault persists, please contact the customer service department for handling.
46	PvConnDirFault	Protection	The positive and negative terminals of the photovoltaic are reversed.	Correctly reconnect the positive and negative terminals of the photovoltaic.
65	Update File Same Version	Prompt	The upgrade firmware is the same as the current firmware version.	Confirm whether the current firmware version is consistent with the upgrade firmware version. An inconsistent version does not support the upgrade.
66	RtcError Warning	Prompt	Communication board clock failure.	1. Turn off the power supply, then turn it on again and wait for the fault to clear. 2. If the fault persists, please contact the customer service department for handling.
67	Mgr EEPROM Warning	Alarm	Communication board E2PROM Read-write failure	1. Turn off the power supply, then turn it on again and wait for the fault to clear. 2. If the fault persists, please contact the customer service department for handling.

Troubleshooting Table (continued)

Alarm ID	Alarm Name	Level	Cause	Suggested Solution
68	Version Mismatch Warning	Prompt	Firmware mismatch	1. The firmware of various components shall be updated to maintain consistency. 2. If the fault still exists, please contact customer service for handling.
70	Rgm Meter Com Warning	Alarm	An extended RGM meter is configured but not connected, or the meter connection line is abnormal.	1. Confirm whether an external extended RGM meter needs to be configured. 2. When an external extended RGM meter needs to be configured, check whether the wiring is correct. 3. If the fault persists, please contact the customer service department for handling.
71	Export Meter Com Warning	Alarm	The connection wire of the electricity meter is abnormal.	1. Confirm whether the wiring is correct. 2. If the fault persists, please contact the customer service department for handling.
72	Update Failure	Prompt	The firmware upgrade process is interrupted due to power outages or manual intervention.	1. Confirm and retry the upgrade. 2. If the fault persists, please contact customer service for assistance.
76	Udisk Update Warning	Prompt	The USB flash drive upgrade is unsuccessful or fails.	1. Check if the USB flash drive is properly inserted and if the file is correct. 2. If the fault persists, please contact customer service for help.
77	Update File Fail Warning	Prompt	The upgrade file name or the content of the upgrade file is incorrect.	1. Check if the folder and file name on the USB flash drive are correct. 2. If the fault persists, please contact customer

Troubleshooting Table (continued)

Alarm ID	Alarm Name	Level	Cause	Suggested Solution
				service for help.
78	Gateway Comm Warning	Alarm	Communication failure between the PCS communication board and Backup Gateway.	1. Check weather the connection between the PCS communication board and Backup Gateway is secured. 2. If the fault persists, please contact customer service for help.
79	BMS Comm Warning	Alarm	Communication failure between the PCS communication board and BMS.	1. Confirm whether the battery can be powered on normally. 2. If the fault persists, please contact the customer service department for handling
80	EPO Fault	Protection	Emergency power off is activated.	1. Check the reason for the emergency shutdown of Gateway or the inverter, manually clear it, and then restart. 2. If the fault persists, please contact the customer service department for handling.
81	Parallel RS485 Com Warning	Alarm	In the paralleling system, the RS485 communication connection between the master-slave inverters is abnormal.	1. Check whether the paralleling communication cable is correctly connected or if the connection plug is loose. 2. Check whether the paralleling role settings are correct. 3. Check whether the termination resistor is correctly installed. 4. If the fault still persists, please contact the customer service department for handling.

Troubleshooting Table (continued)

Alarm ID	Alarm Name	Level	Cause	Suggested Solution
100	Bat_CellVolLow1st_Warining	Alarm	The minimum cell voltage is lower than the preset threshold.	Charge the battery. The fault will automatically disappear when the voltage exceeds the threshold.
101	Bat_TotalVolLow1st_Warining	Alarm	The minimum cell voltage is lower than the preset threshold.	Charge the battery. The fault will automatically disappear when the voltage exceeds the threshold.
102	Bat_CellVolLow2nd_Warining	Alarm	The minimum cell voltage is lower than the preset threshold.	Charge the battery. The fault will automatically disappear when the voltage exceeds the threshold.
103	Bat_TotalVolLow2nd_Warining	Alarm	The minimum cell voltage is lower than the preset threshold.	Charge the battery. The fault will automatically disappear when the voltage exceeds the threshold.
104	Bat_CellVolLow3rd_Err	Protection	The minimum cell voltage is lower than the preset threshold.	Charge the battery. The fault will automatically disappear when the voltage exceeds the threshold.
105	Bat_TotalVolLow3rd_Err	Protection	The minimum cell voltage is lower than the preset threshold.	Charge the battery. The fault will automatically disappear when the voltage exceeds the threshold.
106	Bat_TotalVolLow_Idle	Protection	The minimum cell voltage is lower than the preset threshold and the battery enters sleep mode.	Re-start or wake up the battery, then recharge it.
107	Bat_CellVolLow_NoChg	Protection	The minimum cell voltage is lower than the preset threshold, and battery charging is not allowed.	If there are still fault indications after restarting, please contact the customer service department for handling.
108	Bat_CellVolHigh1st_Warining	Alarm	The maximum cell voltage is higher	Stop charging the battery. The fault will

Troubleshooting Table (continued)

Alarm ID	Alarm Name	Level	Cause	Suggested Solution
			than the preset threshold.	automatically disappear when the voltage drops below the threshold after the battery discharges.
109	Bat_CellVolHigh2nd_Err	Protection	The maximum cell voltage is higher than the preset threshold.	Stop charging the battery. The fault will automatically disappear when the voltage drops below the threshold after the battery discharges.
110	Bat_TotalVolHigh1st_Warining	Alarm	The maximum cell voltage is higher than the preset threshold.	Stop charging the battery. The fault will automatically disappear when the voltage drops below the threshold after the battery discharges.
111	Bat_TotalVolHigh2nd_Err	Protection	The maximum cell voltage is higher than the preset threshold.	Stop charging the battery. The fault will automatically disappear when the voltage drops below the threshold after the battery discharges.
112	Bat_DchgTempHigh2nd_Err	Protection	The maximum cell voltage is higher than the preset threshold.	Stop charging the battery. The fault will automatically disappear when the voltage drops below the threshold after the battery discharges.
113	Bat_ChgTempHigh2nd_Err	Protection	The maximum cell voltage is higher than the preset threshold.	Stop charging the battery. The fault will automatically disappear when the voltage drops below the threshold after the battery discharges.
114	Bat_DchgTempLow2nd_Err	Protection	The minimum temperature is lower than the preset threshold.	Activate the heating film or increase the ambient temperature. The fault will automatically disappear when the battery temperature is above the threshold.
115	Bat_ChgTempLow_Err	Protection	The minimum	Activate the heating film

Troubleshooting Table (continued)

Alarm ID	Alarm Name	Level	Cause	Suggested Solution
			temperature is lower than the preset threshold.	or increase the ambient temperature. The fault will automatically disappear when the battery temperature is above the threshold.
116	Bat_Hardware_Err	Protection	There is a temperature detection fault, or a single-cell voltage detection fault, or a current detection fault.	1. Check if the temperature or voltage sampling wires are broken. Connect the broken sampling wires, and the fault will automatically disappear. 2. If there is no wire breakage and the fault still exists, please contact the customer service department for handling.
117	Bat_ChgCurrentHigh_Err	Protection	The charging current is too large.	1. The current will be automatically limited. If the charge-discharge over-current protection is triggered more than 3 times within an hour, the switch needs to be manually reset to be restored.
118	Bat_DchgCurrentHigh_Err	Protection	The charging current is too large.	1. The current will be automatically limited. If the charge-discharge over-current protection is triggered more than 3 times within an hour, the switch needs to be manually reset to be restored.
119	Bat_AirBreak_Err	Protection	Air switch detection line break.	1. Check if the air switch is disconnected. Connect the broken wires, and the fault will automatically disappear.

Troubleshooting Table (continued)

Alarm ID	Alarm Name	Level	Cause	Suggested Solution
				2. If there is no wire breakage and the fault still exists, please contact the customer service department for handling.
120	Bat_IsoLow_Err	Protection	The system has an insulation fault.	1. Detect the insulation of the positive and negative busbars to the ground. 2. If no problem is found during inspection and the fault still exists, please contact the customer service department for handling.
121	Bat_PreChg_Err	Protection	BMS fails during the pre-charging process.	1. Power on and off again, and try pre-charging. 2. If the fault still exists after three attempts, please contact the customer service department for handling.
122	Bat_InternalCommuLost_Err	Protection	Communication interruption between BMS main board and slave board.	1. Check if the internal communication cables and auxiliary power supply are normal. 2. If they are normal and the fault still exists, please contact the customer service department for handling.
123	Bat_Extreme_Err	Protection	There is a situation where the minimum voltage of a single-cell battery is lower than the threshold, or the maximum voltage of a single-cell battery is higher than the threshold, or the	Restart the manual maintenance unlock, and please contact the customer service department for handling.

Troubleshooting Table (continued)

Alarm ID	Alarm Name	Level	Cause	Suggested Solution
			maximum temperature of the battery pack is higher than the threshold, or the difference between the maximum and minimum single-cell voltages exceeds the threshold, or the State of Health (SOH) of the battery is less than the threshold.	
131	Bat_ChgTempLow_Warining	Alarm	The minimum temperature is lower than the preset threshold.	Activate the heating film or increase the ambient temperature. The fault will automatically disappear when the battery temperature is above the threshold.
133	Bat_CellVolDiff_Warining	Alarm	The voltage difference between single-cell batteries in the battery pack exceeds the preset threshold.	The discharge current will be automatically limited.
134	Bat_CellTempDiff_Warining	Alarm	The temperature difference between single-cell batteries in the battery pack exceeds the preset threshold.	The discharge current will be automatically limited.
135	Bat_TotalVolMismath_Err	Protection	The voltage difference between the total internal voltage (total battery voltage sample value) and the cumulative total voltage (sum of the sampled values of the cell voltages in	1. Detect whether the voltage difference between the total battery voltage and the cumulative total voltage is too high above the preset threshold. 2. If the inspection is normal and the fault still

Troubleshooting Table (continued)

Alarm ID	Alarm Name	Level	Cause	Suggested Solution
			the battery pack) shall not exceed 7V.	exists, please contact the customer service department for handling.
136	Bat_UnrecoverableIdle1H_Err	Protection	1. Internal total voltage > charging cut-off voltage + 20V 2. There is a hardware fault. 3. There is a relay fault. 4. There is a pre-charge fault.	If the fault still persists after restarting, please contact the customer service department for handling.
138	Bat_PosRelay_Err	Protection	The main positive relay has a sticking or damage fault.	1. Check whether the main positive relay is stuck. 2. If it is not stuck and the fault still persists, please contact the customer service department for handling.
139	Bat_NegRelay_Err	Protection	The main negative relay has a sticking or damage fault.	1. Check whether the main negative relay is stuck. 2. If it is not stuck and the fault still persists, please contact the customer service department for handling.
140	Bat_HeatRelay_Err	Protection	The heating relay has a sticking or damage fault.	1. Check whether the heating relay is stuck. 2. If it is not stuck and the fault still persists, please contact the customer service department for handling.

Troubleshooting Table (continued)

Alarm ID	Alarm Name	Level	Cause	Suggested Solution
141	Bat_PreChgRelay_Err	Protection	The pre-charge relay has a sticking or damage fault.	1. Check whether the pre-charge relay is stuck. 2. If it is not stuck and the fault still persists, please contact the customer service department for handling.
146	Bat_SelfChk_Err	Protection	Battery power-on self-test failed.	1. Power on and off again and conduct another self-test. 2. If the fault still exists after three attempts, please contact the customer service department for handling.
147	Bat_CellVolSensor_Warining	Alarm	Voltage sensor detected as abnormal.	1. Check the voltage sampling line for breaks. Repair or replace the broken line to eliminate the fault. 2. If there are no breaks and the fault persists, contact customer service for assistance.
148	Bat_CellTempSensor_Warining	Alarm	Temperature sensor detected as abnormal.	1. Check the temperature sampling line for breaks. Repair or replace the broken line to eliminate the fault. 2. If there are no breaks and the fault persists, contact customer service for assistance.
149	Bat_CurSensor_Warining	Alarm	Current sensor detected as abnormal.	Contact customer service for handling.
156	Bat_CellVoltBreakLine_W	Alarm	Voltage detected as	1. Check the voltage

Troubleshooting Table (continued)

Alarm ID	Alarm Name	Level	Cause	Suggested Solution
	arining		abnormal, voltage sensor abnormal.	sampling line for breaks. Repair or replace the broken line to eliminate the fault. 2. If there are no breaks and the fault persists, contact customer service for assistance.
200	Gateway_InvCommFault	Protection	Gateway and PCS CAN Communication Failure	1. Inspect the connection of the CAN communication cable between Gateway and the PCS to ensure it is secure, and check for any loose ports. 2. If the fault persists, contact the customer service department for assistance.
201	Gateway_EPOFault	Protection	Emergency Shutdown or Quick Shutdown Triggered	1. Investigate the cause of the emergency shutdown for Gateway or the inverter, manually resolve it, and then restart the device. 2. If the fault remains, contact the customer service department for handling.
202	Gateway_ManualOverrid e	Prompt	Gateway Manual Switch Activated	This is a status indication, not a fault, and requires no action.
203	ATS_GridRlyFault	Protection	Mains Relay may Be Damaged	1. Turn off the power supply, then turn it back on and wait for the fault to clear. 2. If the fault persists, contact the customer

Troubleshooting Table (continued)

Alarm ID	Alarm Name	Level	Cause	Suggested Solution
				service department for help.
204	ATS_InvLoadRlyFault	Protection	Paralleling Relay may Be Damaged	1. Turn off the power supply, then turn it back on and wait for the fault to clear. 2. If the fault persists, contact the customer service department for assistance.
205	Gateway_TransformerRlyFault	Protection	Autotransformer relay may be damaged.	1. Turn off the power supply, then turn it back on and wait for the fault to clear. 2. If the fault persists, contact the customer service department for assistance.
210	Gateway_InsideOverTempFault	Protection	Gateway internal ambient temperature is too high.	1. Check if the operating environment temperature of Gateway exceeds the temperature threshold. 2. If the fault persists, contact the customer service department for handling.
211	Gateway_TransformerImbalanceHighFault	Protection	The current of unbalanced load between two phases (L1/L2) exceed 41A in off-grid mode.	1. Turn off the power supply, then turn it back on and wait for the fault to clear. 2. If the fault persists, contact the customer service department for handling.
212	Gateway_EepromFault	Protection	Gateway internal EEPROM read-write fault.	1. Turn off the power supply, then turn it back on and wait for the fault to clear.

Troubleshooting Table (continued)

Alarm ID	Alarm Name	Level	Cause	Suggested Solution
				2. If the fault persists, contact the customer service department for handling.
213	Gateway_IntMeterFlt	Protection	Gateway internal electric meter fault.	1. Turn off the power supply, then turn it back on and wait for the fault to clear. 2. If the fault persists, contact the customer service department for handling.
214	Gateway_GenOverLoadFault	Protection	Generator-side load is too large, exceeding the generator's load-carrying threshold.	1. Check if the generator's power meets the system requirements. 2. Reduce the generator-side load. 3. If the fault persists, please contact the customer service department for handling.
215	Gateway_GenRlyFault	Protection	The generator relay may be damaged.	1. Turn off the power supply, then turn it back on and wait for the fault to clear. 2. If the fault persists, contact the customer service department for handling.
216	Gateway_VoltImbalanceFault	Protection	The unbalanced voltage of the two-phase output of Gateway in off-grid mode is too high, likely caused by unbalanced load power.	1. Reduce the unbalance degree of the load power of the two-phase in off-grid mode. 2. If the fault persists, contact the customer service department for handling.

Troubleshooting Table (continued)

Alarm ID	Alarm Name	Level	Cause	Suggested Solution
217	Gateway_485CommFault	Protection	There is an abnormality in the RS485 communication between Gateway and the inverter.	1. Check whether the communication connection between Gateway and the PCS is correct and whether the ports are loose. 2. If the fault persists, contact the customer service department for handling.
218	Gateway_ATXOverTempFault	Protection	The transformer temperature is too high, and the transformer has an unbalanced load in off-grid mode.	1. Check whether the off-grid load unbalance degree is too high. 2. If the fault persists, contact the customer service department for handling.
224	Gateway_InvEngyLow	Prompt	Gateway detects low battery power in off-grid mode.	1. Check if the remaining battery power is too low. 2. If the fault persists, contact the customer service department for handling.
225	Gateway_GridLost	Prompt	Gateway detects grid loss.	1. Check the grid voltage at the Gateway end for voltage values and correct connections. 2. If the fault persists, contact the customer service department for handling.
226	Gateway_GridOverVolt	Prompt	Gateway detects high grid voltage.	1. Check the grid voltage at the Gateway end for values exceeding the set over-voltage threshold 300V. 2. If the fault persists, contact the customer

Troubleshooting Table (continued)

Alarm ID	Alarm Name	Level	Cause	Suggested Solution
				service department for handling.
227	Gateway_GridUnderVolt	Prompt	Gateway detects low grid voltage.	1. Check the grid voltage at the Gateway end for values lower than the set under-voltage threshold 180V. 2. Check if the mains connection is correct. 3. If the fault persists, contact the customer service department for handling.
228	Gateway_GridOverFreq	Prompt	Gateway detects high gird frequency.	1. Check the grid frequency at the Gateway end for values exceeding the set over-frequency threshold 62Hz. 2. If the fault persists, contact the customer service department for handling
229	Gateway_GridUnderFreq	Prompt	Gateway detects that the grid frequency is too low.	1. Check whether the grid frequency at the Gateway end is lower than the set under-frequency threshold 56Hz. 2. Check if the mains connection is correct. 3. If the fault persists, contact the customer service department for handling.
230	Gateway_GenLost	Prompt	Gateway detects no generator.	1. Check Gateway configuration parameters to see if a generator needs to be configured.

Troubleshooting Table (continued)

Alarm ID	Alarm Name	Level	Cause	Suggested Solution
				2. If a generator needs to be configured, check if there is an actual generator. If there is, check whether the voltage at the Gateway generator port is normal. 3. If the fault persists, contact the customer service department for handling.
231	Gateway__GenOverVolt	Prompt	Gateway detects that the generator voltage is over-voltage.	1. Check whether the generator-side voltage at the Gateway end is higher than the set over-voltage threshold. 2. If the fault persists, contact the customer service department for handling.
232	Gateway_GenUnderVolt	Prompt	Gateway detects that the generator voltage is under-voltage.	1. Check whether the generator-side voltage at the Gateway end is lower than the set under-voltage threshold. 2. If the fault persists, contact the customer service department for handling.
233	Gateway_GenOverFreq	Prompt	Gateway detects that the generator frequency is too high.	1. Check the voltage frequency on the generator side at the Gateway end to see if it is higher than the set over-frequency threshold. 2. If the fault persists, contact the customer service department for handling.

Troubleshooting Table (continued)

Alarm ID	Alarm Name	Level	Cause	Suggested Solution
234	Gateway_GenUnderFreq	Prompt	Gateway detects that the generator frequency is too low.	1. Check the voltage frequency on the generator side at the Gateway end to see if it is lower than the set under-frequency threshold. 2. If the fault persists, contact the customer service department for handling.
235	Gateway_Fan1StopRotor	Prompt	Gateway detects that Fan 1 is blocked.	1. Check if Fan 1 on Gateway has stopped rotating and whether the power supply to the fan is normal. 2. If the fault persists, contact the customer service department for handling.
236	Gateway_Fan2StopRotor	Prompt	Gateway detects that Fan 2 is blocked.	1. Check if Fan 2 on Gateway has stopped rotating and whether the power supply to the fan is normal. 2. If the fault persists, contact the customer service department for handling.
237	Gateway_InvVoltLostFault	Prompt	When in off-grid mode, PCS AC output voltage is undetected.	1. Examine the voltage at the system PCS terminal. Verify if there's a voltage reading, ensure the connection is proper, and check that the PCS operates normally. 2. If the fault persists, contact the customer service department for handling.

5.2 Technical Support

If you need additional assistance, contact your installer or BigBattery Support. Before contacting support, have the following information ready:

- The name of the system owner.
- Your name, phone number, email address, and preferred contact method.
- The serial numbers of the RAIO and RAIO GATEWAY, located on the nameplate on the side of each unit.
- A concise description of the issue, including relevant alarm IDs or alarm names.

BIGBATTERY TECHNICAL SUPPORT

Support@BigBattery.com | (818) 280-3091

6. Actions in the Event of an Emergency

In any hazardous situation that could harm health or cause serious injury, evacuate to a safe location. Once it is safe to do so, contact local emergency services immediately.

In the Event of a Fire

- When it is safe to do so, turn off the RAIO circuit breaker on RAIO GATEWAY and the solar shutoff switch.
- Evacuate to a safe area.
- Once it is safe, contact local emergency services promptly.
- If it is safe, use approved fire-extinguishing equipment.

In the Event of Flooding

- If wiring sections of RAIO or RAIO GATEWAY are submerged, stay away from the water because it presents an electrocution hazard.
- If it is safe and possible, drain the water to protect RAIO and RAIO GATEWAY.
- If water reaches the battery, contact your installer for inspection. If the water level remains below the battery, completely dry the site and equipment before returning the system to service.

Abnormal Noise, Unpleasant Odor, or Smoke

- Check that the air vent is not blocked.
- Keep the installation site well ventilated.
- Call your installer or BigBattery Support for assistance.

7. Warranty & Support

12-Year Limited Warranty

The BigBattery RAIO is covered by a 12-year limited warranty, subject to the applicable written BigBattery warranty terms, conditions, exclusions, and proof-of-purchase requirements. This manual does not replace or expand those written warranty terms.

Warranty Service

For warranty service, record the RAIO and RAIO GATEWAY serial numbers, installation date, software version, alarm information, and a concise description of the issue. Contact BigBattery Support before opening, modifying, or attempting to repair the equipment.

⚠	**NOTICE:** Unauthorized opening, modification, or repair can create safety hazards and may affect warranty eligibility.

Thank you for choosing BigBattery.

Own Your Power.