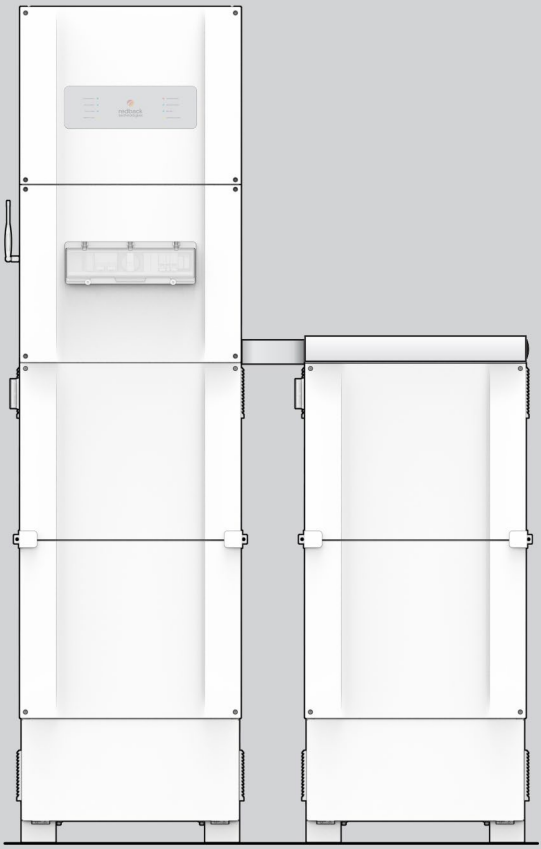
redback technologies

Owner's Guide

Redback Smart Hybrid System
SH5000 Inverter
BE13200 or BE14000 Battery Enclosure

V3.8



HISTORY

VERSION	ISSUED	COMMENTS
1.0	01-Jun-17	First release
2.0	07-Sep-17	Updated
3.0	16-Jul-19	Updates & corrections; Re-formatted
3.1	19-Aug-19	Backup troubleshooting added; terminology standardized.
3.2	12-Jun-20	Update to 2-Pole Battery System DC isolator
3.3	10-Jul-20	Include BE14000 with on-cabinet Battery Isolator
3.4	13-Sep-21	Updated; rebranded
3.5	19-Dec-21	Spec table updated
3.6	04-Mar-22	Wi-Fi compatibility update
3.7	11-Mar-22	Spec table updated: Improved MPPT range. Dual Enclosure references added.
3.8	11-May-22	P11,12 Warning regarding warranty being affected by keeping the system offline. P24 Added Earth Fault Alarm information.

CONTACT INFORMATION

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NOTICE OF COPYRIGHT

PRIVACY NOTICE

Redback will use the personal information provided to us only for warranty purposes. Without this information we will not be able to process your warranty claim. If you require further information about our privacy policy, please visit our website at redbacktech.com.

340-00326-03

Contents

1. Welcome

Congratulations on purchasing your new Redback SH5000 Smart Hybrid Inverter and BE13200 or BE14000 Battery Enclosure. Our products are designed in Australia, manufactured to our high quality-standards, and will provide years of service.

The system's goal is to maximise the use of your self-generated solar energy while minimizing the amount of energy consumed from the grid.

This guide describes the features, use and maintenance of your Redback SH5000 Inverter and optional Battery Enclosures.

2. Introduction

Your Redback inverter and software coordinate one or two solar arrays, battery storage, grid supply and your home, including one backup circuit and up to four relay-controlled devices.

The energy produced by the solar array is automatically directed to the battery, your home and/or the utility grid for the highest performance and best economic return.

The backup functionality enables users to have continued supply of electricity to the backup circuit in the event of a utility power outage.

The MYRedback app and Redback portal provide a comprehensive view of the energy consumed or generated by your home, providing the information required to fine-tune your system settings or optimise your energy usage patterns.

3. Other resources

SOURCE	COMMENT	LINK
Homeowner's guide	This document in pdf format	redback.link/shog
Redback Document Library	Password required	redback.link/docs

4. Transfer of ownership

If a Redback system is already installed in your new home, welcome to the Redback family. To get the best from your Redback system, and to receive important notifications from your system, you need to setup an account using a valid email address. You can then access the system using the Redback app or portal, see how the system is working for you, and gain insights to help maximise your consumption of self-generated energy.

When we setup your account, we'll also arrange for remaining warranty to be transferred to your name and we can answer any questions you may have about your system.

To get started, contact the Redback Customer Support Team. We're available Monday to Friday, 8am-4pm, AEST. That's Brisbane time. We'll need some proof of ownership too, so be ready for that.

In Australia: 1300 240 182

In New Zealand: +61 7 3180 2325

Email: customersupport@redbacktech.com

Important safety instructions – please read

This document contains important safety instructions for products produced by Redback Technologies. Please read all the instructions and cautionary markings on the product and on any accessories or additional equipment included in the installation. Failure to follow these instructions could result in severe shock or possible electrocution. Always use extreme caution to prevent accidents.

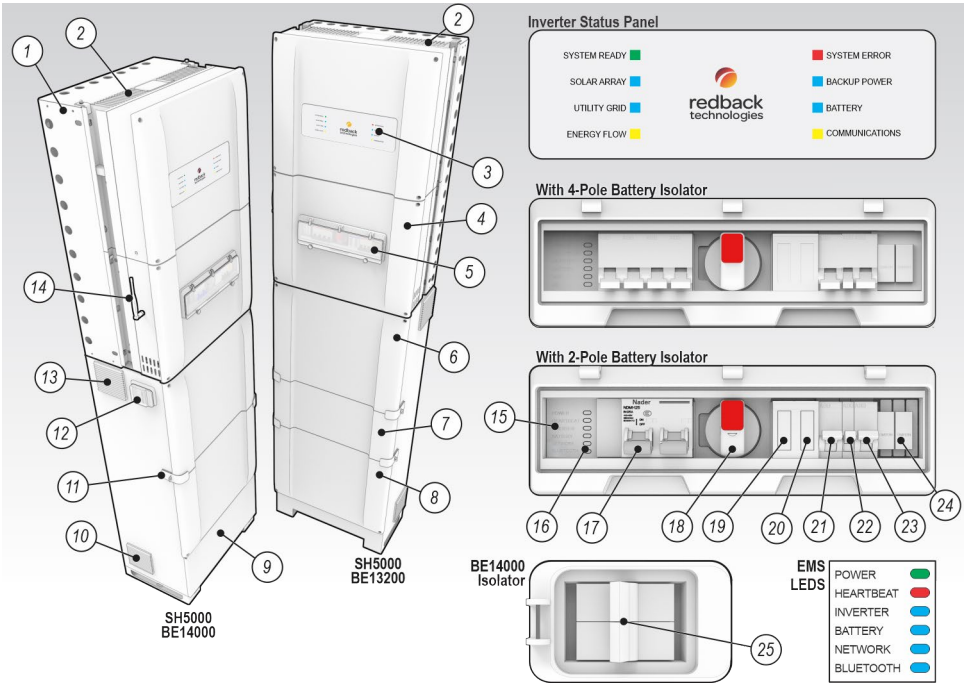
SYMBOL	DEFINITION
	**WARNING: LETHAL VOLTAGE INSIDE** Do not remove inverter or battery enclosure covers unless qualified to do so or have been instructed to do so by Redback Technologies technical support personnel. Do not perform any servicing other than that specified in the maintenance instructions. Solar arrays may be energised even in low ambient light.
	**DANGER.** Risk of electrical shock. Proceed with caution.
	**WARNING: Burn Hazard.** External and internal parts may be hot. Do not remove covers during operation or touch any internal parts.
	**CAUTION: Hazard to Equipment** Only use components or accessories recommended or sold by Redback Technologies or its authorised agents. Handle all parts with care and follow the instructions provided.
	**WARNING: Fire hazard** Do not keep combustible or flammable materials in the same room as the equipment. The Redback Smart Hybrid System contains relays and switches which are not ignition protected. Do not allow storage of any item inside the inverter, or any items inside the battery enclosure other than batteries. Ensure clearance requirements are strictly enforced. Keep all vents clear of obstructions that can prevent proper air flow around, or through, the unit.
	**DELAY.** Wait specified time e.g., 10 minutes.
	This symbol indicates the information provided is important for the correct operation and or maintenance of the equipment. Failure to follow the recommendations may result in annulment of the product warranty.
	**IMPORTANT** Only use the battery types recommended by Redback Technologies. Follow the battery manufacturer's recommendations for installation and maintenance. Insulate batteries appropriately against freezing temperatures. A discharged battery will freeze more easily than a charged one. Remote or automatic generator control systems: disable the starting circuit and/or disconnect the generator from its starting battery while performing maintenance.

5. Features and benefits of your Redback system

SYSTEM FEATURE	BENEFIT	REQUIREMENT
Internet connected	Inverter monitoring and management using the MYRedback app or Redback portal. Remote viewing of inverter status.	Permanent internet connection using your Wi-Fi or ethernet based home network.
MYRedback app and Redback portal	Monitor your home energy performance in real time, including up to 3-phases of grid consumption, using high quality, detailed charts. See your true usage patterns and tune your energy consumption, storage, export, and backup plan accordingly. Share system access with family, tenants etc.	Permanent internet connection using your Wi-Fi or ethernet based home network.
All-in-one design	Neat appearance; Easy to keep clean.	
Status panel	Colour coded LEDs to aid diagnostics.	
EMS	The Energy Management System (EMS) is the inverter's internal Control Board.	Internet connection for occasional software updates.
Switchgear hatch	Convenient control of solar and battery connections. Ability to bypass inverter backup without affecting house or backup circuits. EMS LEDs aid diagnostics.	
Low maintenance	Homeowners can complete essential annual maintenance. A service call is not required.	Basic mechanical skills and tools.
Supports multiple batteries	Improved management and consumption of self-generated energy. Start small, then extend the storage capacity to suit your actual usage patterns.	Ask your installer for advice on upgrading your system storage.
Backup functionality	Some devices remain available during a grid outage if solar power or battery are available.	Optional backup circuit required and active; Battery is required.
Relay control	Up to four relay-switched house circuits or devices can be timer controlled using the Redback app or portal.	Relay connected circuits. #3 and #4 relays are optional extras.
Grid power quality monitoring	The inverter can self-protect from poor quality grid power and recover when quality improves.	
Internal overload protection	The inverter will self-protect if it detects excessive heat or excessive internal currents.	
Battery Management System	Batteries self-monitor to manage heat, State of Charge (SoC), and charge and discharge rates, to extend battery life.	
Critical setting protection	Critical system settings may only be changed by electrically qualified personnel.	
Solar array ground fault and insulation monitoring	Electrical safety for all parts of your system.	

6. System description

6.1 Major components and dimensions

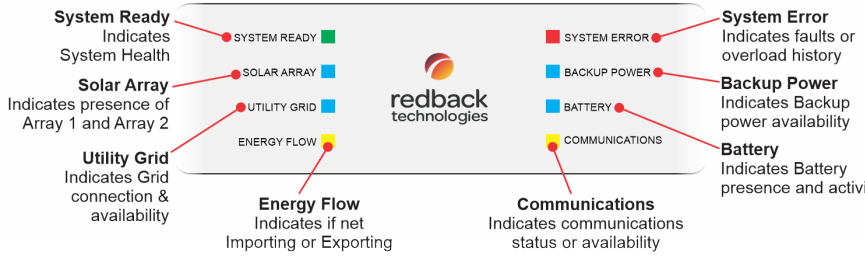


#	PART NAME
1.	Wall Mounting Frame
2.	Inverter Heatsink Fins
3.	Inverter Status Panel
4.	Inverter BoS Front Cover
5.	BoS Switchgear Hatch
6.	Battery Enclosure Upper Front Cover
7.	Enclosure Middle Front Cover*
8.	Enclosure Lower Front Cover
9.	Enclosure Kick Panel**
10.	Enclosure Air Inlets (Filter cover)
11.	Enclosure Padlock Hoop
12.	Battery Enclosure Isolator Cover**
13.	Enclosure Extractor Fans (Filter cover)

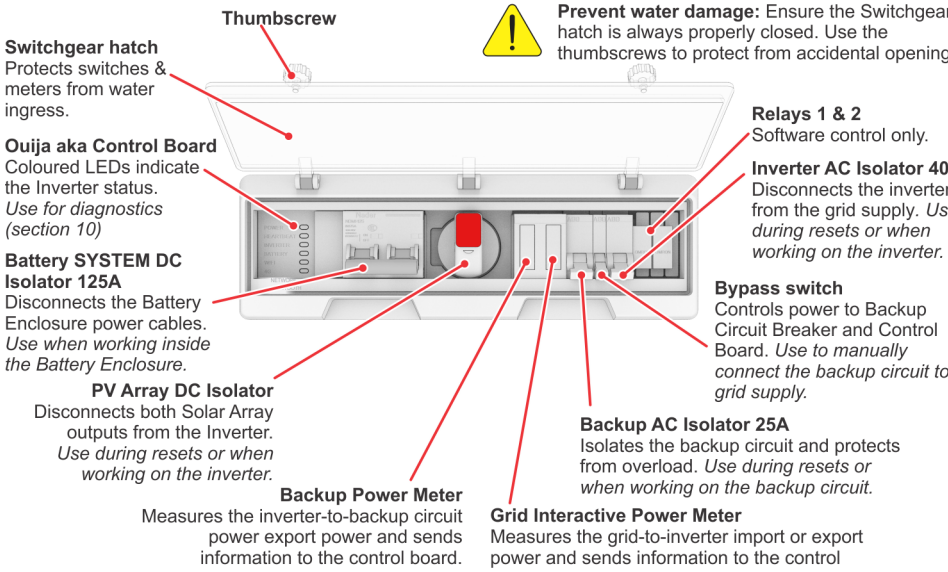
#	PART NAME
14.	Wi-Fi antenna
15.	Energy Management System (EMS)
16.	EMS Status LEDs
17.	Battery System DC Isolator (2P or 4P)
18.	PV Array DC Isolator
19.	Backup Power Meter
20.	Grid Interactive Power Meter
21.	Backup AC Isolator
22.	Bypass Switch
23.	Inverter AC Isolator
24.	Relays #1 and #2
25.	Battery Enclosure Isolator Switch*

*Fitted to BE13200 only **Fitted to BE14000 only.

6.2 Status Panel LEDS



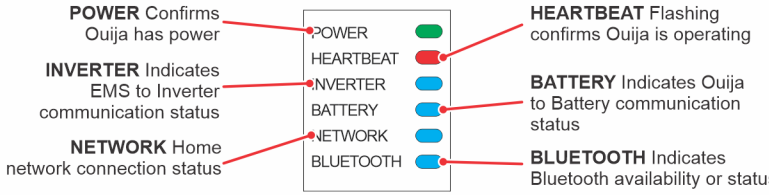
6.3 BoS switchgear



6.4 EMS LEDs

In 2018, the EMS LED labelling was updated: the unused 4G LED was repurposed for Bluetooth notification, and the Wi-Fi LED was renamed to Network. There were no other changes to the EMS.

In this document "Network LED" means the Network LED or the Wi-Fi LED, and "Bluetooth LED" means the Bluetooth LED or the 4G LED. Your inverter and software work the same regardless of the labels.



6.5 Batteries and Battery Enclosure

Your Redback system has a storage capacity of up to 23.6kWh using one or two BE13200 enclosures and up to 28kWh using BE14000 enclosures. Each enclosure holds up to four batteries—depending on battery model—and a second enclosure is always required for five or more batteries.

NOTE: US3000C batteries are not supported.

The allowable battery combinations and resultant storage capacity is shown below (in KWh).

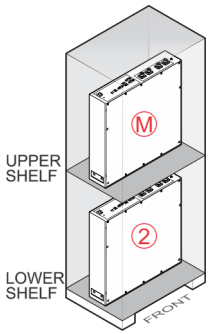
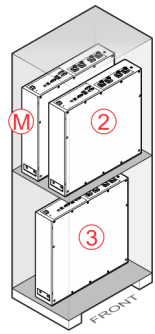
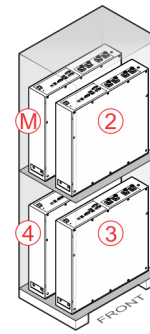
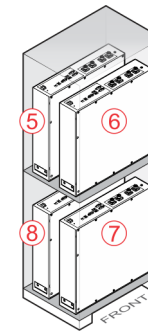
		Number of US3000 batteries @3.55kWh each●													
		Using BE13200s					Using BE14000 Enclosures								
		0	1	2	3	4	0	1	2	3	4	5	6	7	8
Number of US2000ˣ batteries @ 2.4kWh each● (5 or more require two enclosures)	0	0	■	7.10	10.65	14.20	0	■	7.10	10.65	14.20	17.75	21.30	24.85	28.40
	1	■	5.95	9.50	13.05	16.60	■	5.95	9.50	13.05	16.60	20.15	23.70	27.25	♦
	2	4.80	8.35	11.90	15.45	19.00	4.80	8.35	11.90	15.45	19.00	22.55	26.10	♦	♦
	3	7.20	10.75	14.30	17.85	21.40	7.20	10.75	14.30	17.85	21.40	24.95	♦	♦	♦
	4	9.60	13.15	16.70	20.25	23.80	9.60	13.15	16.70	20.25	23.80	♦	♦	♦	♦
	5	12.00	15.55	19.10	22.65	♦	12.00	15.55	19.10	22.65	♦	♦	♦	♦	♦
	6	14.40	17.95	21.50	♦	♦	14.40	17.95	21.50	♦	♦	♦	♦	♦	♦
	7	16.80	20.35	♦	♦	♦	16.80	20.3	♦	♦	♦	♦	♦	♦	♦
	8	19.20	♦	♦	♦	♦	19.20	♦	♦	♦	♦	♦	♦	♦	♦

●Usable capacity is typically 90% of total capacity ■Battery installations must include a minimum of two batteries of any listed model
♦Insufficient space in enclosure for this combination. ˣPylontech US2000 or US2000Plus

Pylontech batteries use an integrated Battery Management System (BMS) to manage ultimate charge and discharge rates (protecting the batteries from heat damage) and inform the Smart Hybrid System of status. The BMS also protects the batteries from total discharge, assisting system reliability and longevity.

Your installer may identify batteries as Master, 1, 2, 3 etc up to 8. This refers to the position of individual batteries in the BMS chain of command, where the first connected battery is the Master, which controls subsequent batteries.

The battery identity may also indicate the physical position of the battery within the enclosure, though this is an installer preference. The diagram below indicates the BMS battery naming convention and recommended battery locations.

TWO BATTERIES	THREE BATTERIES*	FOUR BATTERIES*	5TH TO 8TH BATTERIES*
			

*Only one US3000 per shelf in BE13200. **Any combination of US2000, US2000 Plus, US3000 permitted in BE14000. ***If used, one of the US3000 batteries must be the Master battery, in the 1st enclosure.

6.6 Backup circuit (optional)

The SH5000 can directly control and power one circuit, known as the backup circuit. This feature is used to extend the run time of a small number of low power or occasional use devices that you have prioritised for use during a power outage.

- During a grid outage, the SH5000 powers the backup circuit from batteries and or solar.
- If grid supply is available, the inverter chooses the power source from solar, batteries or grid.

Adding a backup circuit to your home requires planning to maximise the benefits of your investment. A new, dedicated circuit will give a better result than re-purposing an existing circuit. Your system designer can help you specify an affordable system that balances cost and performance, based on your expected usage patterns and your backup expectations i.e. what you expect to run, and for how long.

Loads on the backup circuit must be carefully selected to extend the backup power availability, noting:

- Battery storage capacity and availability.
- Inverter power delivery limitations.
  - Up to 4600W continuous.
  - Up to 6900W for up to 10 seconds.
- Inverter behaviour during overload events.
- Inverter behaviour during high temperature events.
  - Above 45˚C ambient, power output is reduced.
  - Above 60˚C, the inverter will shut down.

A battery is required for best performance. Solar-only power is not satisfactory—backup load and solar power are variable and unpredictable—when backup load exceeds the available solar power the inverter will automatically shut down and restart.

To ensure some backup, a portion of the battery storage can be reserved, powering the backup circuit until the battery reaches the minimum State of Charge (SoC). The size of the reserve can be varied according to your needs e.g., more for backup means less for daily use. See Section 8.3.

7. System limitations

Your Redback SH5000 Smart Hybrid Inverter and Battery Enclosures are not suitable for:

- Batteries other than Pylontech US2000 or US3000.
- Off-Grid installations (the grid is intentionally disconnected). Lithium-ion batteries have a finite number of charge/discharge cycles available. Off-grid installations cycle more frequently, reducing battery life.

WARNING! This equipment is NOT intended for use with life support equipment or other medical equipment or devices.

- Locations without internet access: the system can operate off-line but is unable to send you fault notifications. You will be unable to review consumption or performance; make informed decisions about system settings or consumption patterns; change settings; or remote control the system. You may also affect your warranty coverage if the system is offline for extended periods
- Prediction of your energy bills. The Redback meters are not Utility Grade: they provide a good indication of energy consumption; however, readings may vary slightly from the Network meters used for billing.
- Use with generators.
- Use with 5Ghz Wi-Fi networks.

8. Getting the best from your system

Your Redback system is designed to operate autonomously – the level of interaction is up to you.

A set-and-forget approach will work fine, and occasional maintenance is all that is required.

Alternatively, you can dive deep into your data and make informed decisions to optimise your system and maximise the return on your investment.

Either way, the first step to getting the best from your system is to look after it.

8.1 Keep your system in good condition

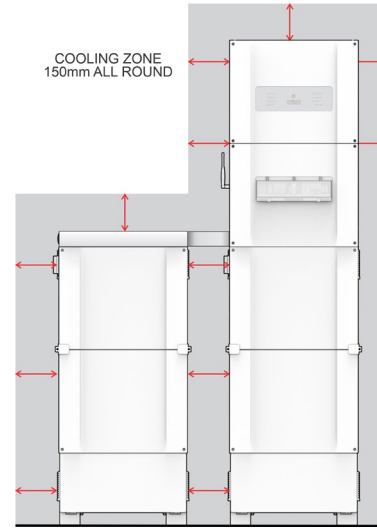
Keeping your system in good condition maintains efficiency, increases longevity, and helps us help you, if the need arises. There are three key items requiring your attention.

Cooling

Your system uses fresh air to cool the inverter and batteries. If your system becomes too hot its efficiency decreases, and it may even shut down.

There must always be 150mm of clear space beside and above your system. Ensure no items are left near the base of the system or placed on top of the inverter, as vents will be obstructed.

The system must not be enclosed i.e., do not build a cabinet around it.



Maintenance

Complete the annual maintenance items in Section 13. In very dusty conditions you may need to clean the filters more frequently.

Internet connection

Data is required to get the best out of your inverter. A permanent internet connection enables the inverter to send data to the Redback cloud, where the MYRedback app or Redback portal present helpful charts, enabling you understand your system's performance. Your installer or Redback can also use the data to diagnose problems or suggest improvements to settings, based on your actual usage.

- Note: Your inverter will continue to function without an internet connection, but you will be unable to receive any fault notifications, no data will exist for the period of disconnection, and remote support will be limited. You may also affect your warranty coverage if the system is offline for extended periods

8.2 Monitor performance

Redback offers two choices for monitoring the energy performance of your household.

8.2.1 MYREDBACK APP

MYRedback provides a simple, up-to-date view of what's happening at your place – it's great for quickly checking the energy flow at home. MYRedback is available from your app store, for Android 7 or higher, or iOS 12.1 or higher. Use the app to:

- Check your home energy usage.
- Reconnect your system to the internet.
- Review your system performance - but you will need to contact your installer if changes are required.

8.2.2 REDBACK PORTAL

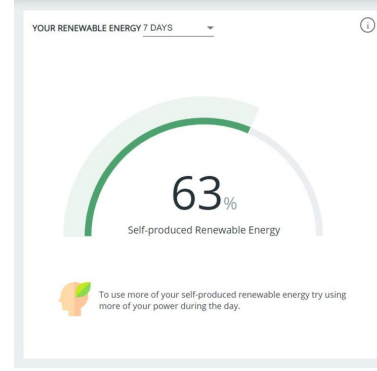
The Redback portal portal.redbacktech.com offers all the features of the MYRedback app plus a comprehensive history of your systems performance, much greater detail about your system, and direct access to support documents.

DASHBOARD

The dashboard view provides an overview of your system:

- Energy consumption trends
- Power demand
- Power being bought or exported
- Power from solar
- Power to/from batteries
- Stored energy

If nothing else, you should view the Renewable Energy Meter regularly; it shows the system's impact on your energy consumption during the past 7, 30 or 90 days. If it falls below 60%, it's worth reviewing your usage habits or your system size and settings.



8.3 Getting the best from your batteries

Your batteries will do a great job of looking after themselves, with no intervention required if they have the correct State of Charge (SoC) settings for your needs.

SETTING NAME	COMMENT
Minimum SoC %*	In day-to-day use, your batteries may discharge down to this % of total capacity.
Minimum SoC Offgrid %*	This is the deep discharge limit- it protects the battery from damage due to over-discharge during a backup event i.e. during a blackout.

*State of Charge: The battery manufacturer will specify the lowest acceptable value.

Frequent deep discharging will shorten the life of your battery. If you experience frequent blackouts in your area, ask your installer to set the Minimum SoC higher than usual. This extends your backup run-time and reduces the number of deep discharge events.

Backup Reserve

Your system configuration and backup requirements will determine your settings, which create the Battery Usage Plan, as shown right.

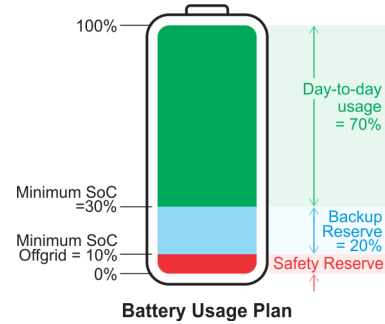
The Backup Reserve is the energy withheld for use by the backup circuit during a grid outage event.

Backup Reserve = (Minimum SoC – Minimum SoC Offgrid) %

The Backup Reserve is a balancing act: A large reserve increases the backup run-time when needed but may decrease the everyday use of self-generated energy.

Put another way, it's blackout security v. energy cost.

Think about your own needs, then ask your installer to adjust the Minimum SoC according to your priorities.



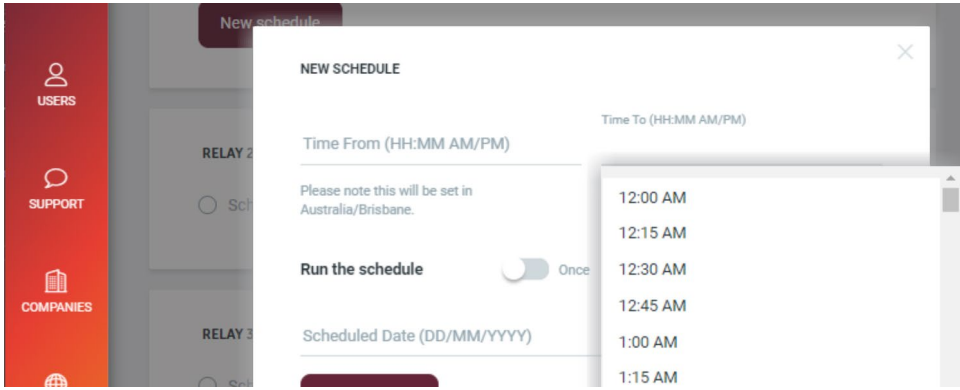
Battery Usage Plan

8.4 Getting the best from your relays

Your inverter can control up to four relays- usually used to turn specific equipment ON or OFF remotely, or ON and OFF according to a once-off or daily schedules. The objective is to move power usage into daylight hours, after batteries have charged, and when excess solar power is being exported or not used at all. Typical applications are pool or water tank pumps, and hot water systems.

To use this feature, ask an electrician to install a dedicated, relay-controlled circuit for the equipment.

The schedules are created in the Redback portal, under the CONTROL tab. Multiple daily events are permitted excepting that they may not overlap and must start and finish on the same day. Manual control is also possible, using the ON and OFF controls.



8.5 Getting the best from your backup circuit

Your SH5000 inverter includes one backup circuit activated during a grid outage and powered by the system batteries and or solar. The inverter can provide power to the backup circuit if:

- Power is available from batteries or solar, and
- Total household, continuous power demand is less than 4600W, and
- Total power demand is less than the power available from batteries and solar.

AVOID INVERTER SHUTDOWNS! The total power load matters: simultaneously running a kettle, toaster, microwave, large fridge, TV and a few lights can easily exceed the allowable power delivery, and an inverter shutdown will occur.

Solution: Minimise devices in use.

Generally, you should connect and use the minimum number of devices at any one time.

Only essential or low consumption devices or appliances should be connected to the backup circuit. Devices that require high currents should not be connected as they may trip the inverter or rapidly discharge the batteries. The table below lists the suitability of common devices.

The inverter can fulfil demand of 6900W for up to 10 seconds: this is useful for devices that have high starting power, but low power demand when running.

The inverter will reduce power output above 45˚C ambient and shut down above 60°C.

If the system battery reaches minimum SoC during a grid outage the inverter will attempt to fulfil the backup circuit demand from solar- if demand exceeds available solar power the inverter will shut down automatically. Solar is unpredictable—it varies with cloud cover—so this situation is best managed by minimizing devices in use.

☑ SUITABLE	☒ NOT SUITABLE
Refrigerators and freezers	Critical Medical Devices
Fans	Air conditioners & heaters
Small, occasional use, plug-in appliances e.g. microwaves, kettles, toasters	Ovens & cooktops
TVs, radios	Home theatres and Projectors
Computers, tablets, routers	Hot water systems
Telephones	Spas, saunas, pool pumps
Household tank water pumps	Battery chargers & corded Power tools
Low-energy LED or CCFL lighting	Incandescent or high-power lighting

9. Inverter operation

Your SH5000 inverter has sophisticated software controls available in the MYRedback app or the Redback portal, however there are some physical controls or functions at the unit.

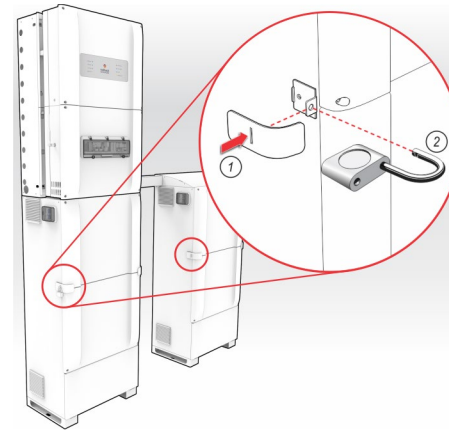
9.1 Locking up the batteries

Secure the battery enclosure to:

- Prevent unauthorised access to the batteries and cabling.
- Discourage battery theft.

The enclosure is secured by trapping the front covers: clamps at either side are padlocked in position, restricting access to front cover fasteners, and resisting forcing of the covers.

Note: The security clamps will discourage a casual or opportunistic intruder but will not stop a determined thief.



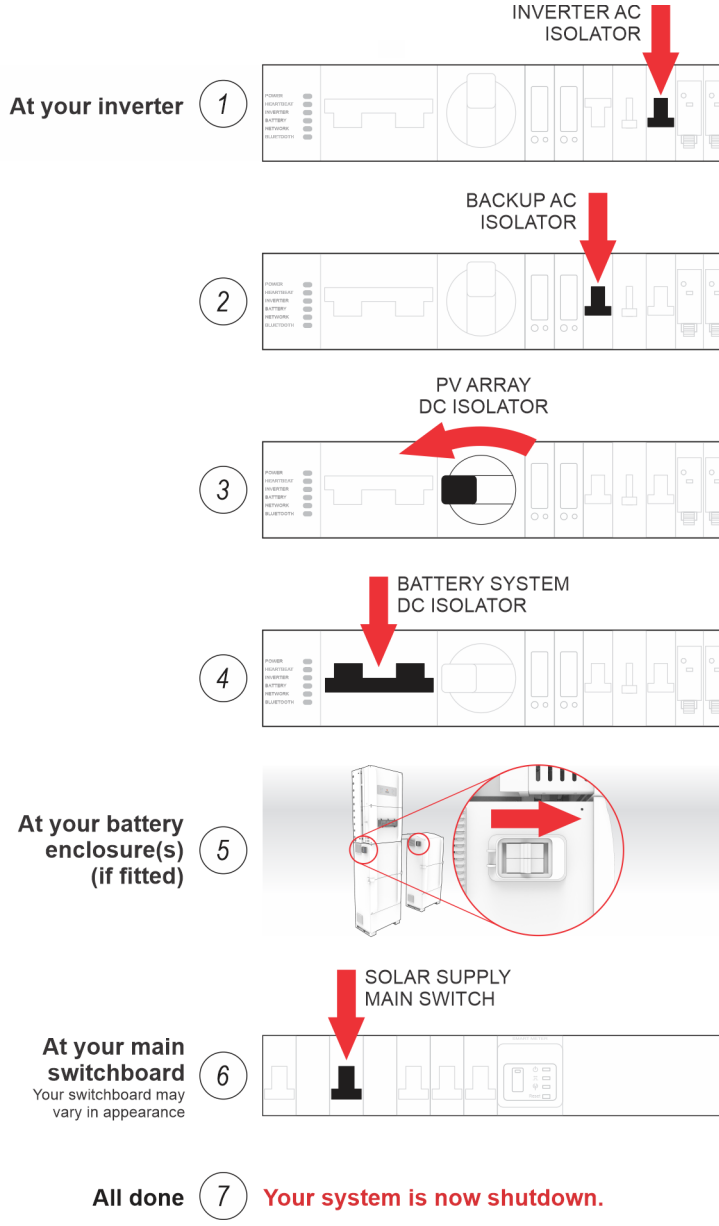
9.2 Inverter – Changing bypass modes

The Bypass switch controls the power to the BACKUP AC isolator and the EMS. Its primary use is to manually connect the backup circuit directly to grid supply, when required.

POSITION		FUNCTION	COMMENTS
	Up	Power to the backup circuit is from the grid supply only. The inverter no longer controls the backup circuit.	This mode ensures grid supply to the backup circuit if the inverter is not available or not operating reliably. If grid supply is lost the inverter will not supply the backup circuit.
	Middle	Backup circuit and EMS are isolated (depowered).	Used to restart the EMS. No power is sent to the backup circuit.
	Down	Power to the backup circuit is supplied and managed by the inverter, from any source.	This is the recommended operational mode. If grid supply is lost the inverter will continue to supply the backup circuit from the batteries and PV- the entire system will shut down when the batteries reach the minimum SoC.

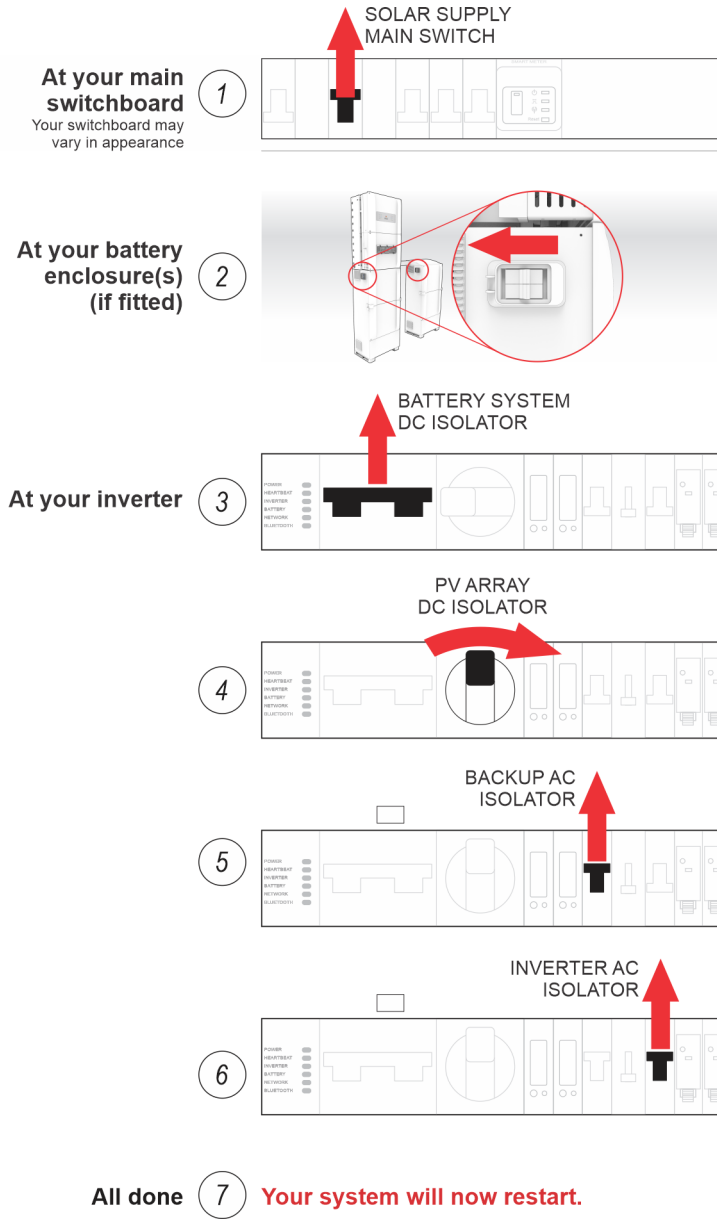
9.3 Shutdown procedure

Occasionally, it may be necessary to shut down the inverter interrupting all inverter functions, noting that PV, battery, and grid supplies remain energised to the isolators.



9.4 Inverter restart

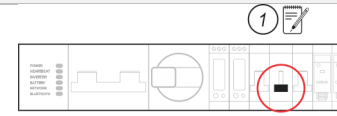
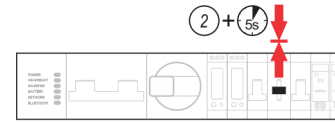
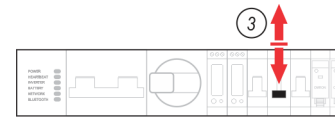
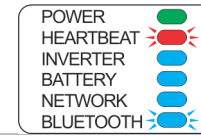
Occasionally, it may be necessary to cold boot the inverter, to restart all software. A restart briefly interrupts all inverter functions, noting that PV, battery, and grid supplies remain energised to the isolators.



9.5 EMS restart

Occasionally, it may be necessary to restart the EMS software. A restart will reboot the EMS, without needing to restart the whole inverter, noting that the backup circuit will be briefly interrupted.

DO NOT restart unless instructed to do so by Redback support staff.

STEP	PROCEDURE		COMMENT/ILLUSTRATION
1.	Open the BoS switchgear hatch. Identify the three-position Bypass switch. Note the position of the switch. ☐ Up ☐ Down *Note: The switch is usually returned to the original position during restart.*		
2.	Set the Bypass switch to the middle position (OFF). Wait 5 seconds.		
3.	Return the Bypass switch to its original position (if noted) otherwise place in the DOWN position. The EMS will restart in approximately 10 minutes, indicated by the EMS LEDs stabilising to:		
	POWER	Green; ON	
	HEARTBEAT	Red; FLASHING	
	INVERTER	Blue; ON	
	BATTERY	Blue; ON (if batteries are connected)	
	NETWORK	Blue; ON (if Network is OK)	
	BLUETOOTH	Blue; FLASHING (for extra 30 minutes, then OFF)	

10. Inverter operating modes

The inverter operating modes are summarised below. Select modes using the Redback app or portal.

10.1 Auto mode

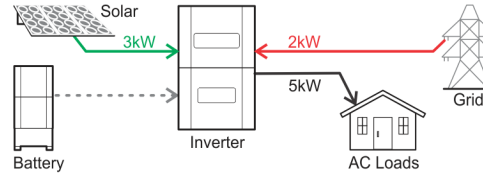
AUTO is the default operating mode, maximising consumption of self-generated and stored energy. If the inverter mode has been changed, AUTO can be reselected from the Redback portal.

If AC loads (House) exceeds solar generation, energy sources are prioritised as follows:

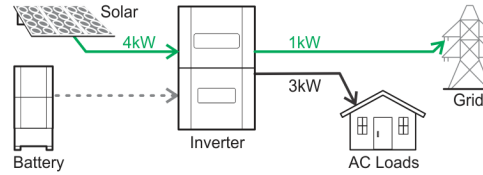
1. Solar
2. Battery
3. Grid

If solar production exceeds AC loads, destinations for self-generated energy are prioritised as follows:

1. AC Loads
2. Battery (storage)
3. Grid (if enabled)



AUTO Mode: AC Load exceeds Solar Generation

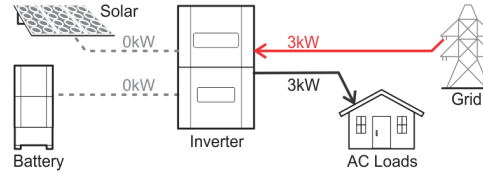


AUTO Mode: Solar Generation exceeds AC Load

10.2 Standby mode

STANDBY mode is invoked automatically when no solar or battery energy is available. The SH5000 directs grid power directly to the AC Loads thereby minimising energy losses in the inverter e.g. heat.

The SH5000 automatically reverts to the previous mode of operation when solar or battery energy is available.



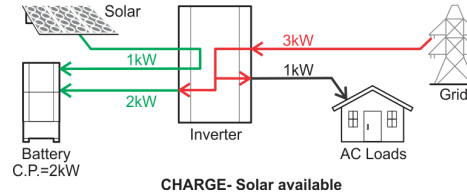
STANDBY MODE- No Solar or Battery energy available

10.3 Charge battery mode

CHARGE mode may be used to prepare for a severe weather event, and prioritises charging the battery at the nominated rate, from the grid.

Any available solar will supplement the grid charging up to a maximum charge rate of 4.6kW.

AC Loads are fulfilled by the grid.



CHARGE- Solar available

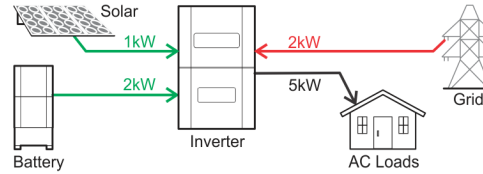
10.4 Discharge battery mode

DISCHARGE mode is user selectable in the Redback portal, and prioritises battery discharge to the following:

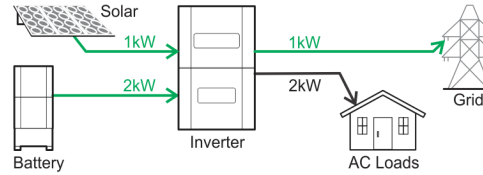
1. AC Loads
2. Grid

Battery discharge is at the nominated Discharge Power, supplemented by solar.

- If AC Loads exceed (Battery + Solar), energy is imported from the grid.
- If (Battery + Solar) exceed AC Loads, excess energy may be exported to the grid.
- If (Battery + Solar) exceeds (AC Loads + LEP) the battery discharge is prioritised, at the maximum possible rate, up to the nominated Discharge Power.



DISCHARGE- Solar + Battery is less than AC Load



DISCHARGE- Solar + Battery is greater than AC Load

10.5 Backup mode

BACKUP mode starts automatically when the grid supply is interrupted (default setting).

In BACKUP mode, the SH5000 provides energy to the AC backup circuit only. Energy consumption from solar is prioritised and excess solar charges the batteries.

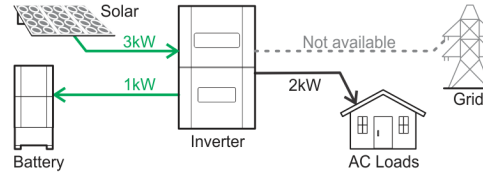
To maximise the effectiveness of the AC backup circuit, the circuit should only support essential appliances such as refrigerators, or low energy devices such as fans, computers, tablets or phones.

BACKUP mode is invoked within 0.05 seconds of a grid interruption. BACKUP mode reverts to the previous mode when the inverter detects grid supply has been restored for over 1 minute.

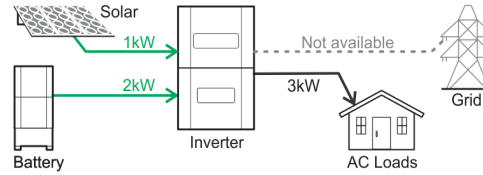
BACKUP mode may also be known as “Stand-alone Mode”.

Note: If available battery and solar power is less than the detected Backup Load the inverter will consider this an overload and will automatically shut down.

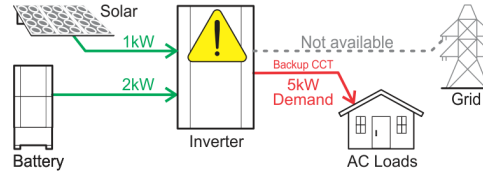
The inverter will restart after approximately one minute. If overload persists, the cycle will repeat.



BACKUP Mode- Solar generation is greater than Backup Load



BACKUP Mode- Backup Load is greater than Solar



Solar+Battery < Backup Load

11. Onboarding the inverter

Onboarding connects your inverter to the internet using your network. If you can login to the Redback portal and your system is “Online”, then your system is onboarded. Connection to the network is by Ethernet cable or Wi-Fi.

> This equipment is not compatible with 5Ghz Wi-Fi networks or hotspots. Use 2.4Ghz networks.

Occasionally, it may be necessary to reconnect your inverter to the internet. This most frequently occurs after a significant disruption to your network such as replacing your router, changing passwords, or changing internet providers.

There are two onboarding processes: Ethernet or Bluetooth Low Energy (BT or BLE).

11.1 Ethernet

Ethernet is the preferred method of connection: onboarding occurs automatically, confirmed by:

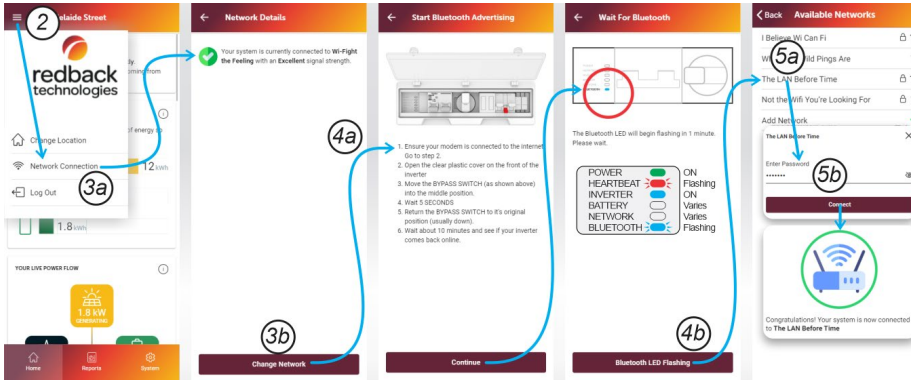
- Inverter COMMUNICATIONS LED is Yellow (continuous i.e., not blinking), and
- EMS NETWORK LED is Blue (continuous).

11.2 Bluetooth Low Energy (BLE)

BLE onboarding is required if ethernet is not available–a Bluetooth connection is established between the inverter and the MYRedback app, and the app will guide you through the process of connecting the inverter to your Wi-Fi network.

To onboard using Bluetooth:

1. Go to your inverter. Ensure your network signal is Good or better at this location.
2. On your device, open MyRedback and login. Touch the **Hamburger** to display the flyout menu.
3. Select **Network Connection.** Note your system status and select **Change Network**.
4. You may be notified to start Bluetooth—follow the on-screen instructions. Bluetooth advertising is active when the BLUETOOTH LED is flashing steadily. Touch **Bluetooth LED Flashing** to continue.
5. Select **your Wi-Fi network** from the list.
6. Enter **Password** if requested, and touch **Connect**. A success message will appear.
7. Wait a few minutes and then confirm onboarding success:
    - On the app, check that data is refreshing every 20 seconds;
    - On the Portal, check that your system is online, and refreshing every 60 seconds.
8. If onboarding fails, try again, or contact Redback Customer Support for assistance.

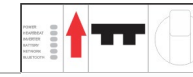
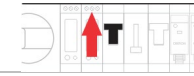
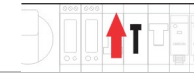


12. Troubleshooting

12.1 Backup circuits have no power

The most common causes are overloaded circuit isolators tripping OFF (anytime), or the battery being fully discharged (during a grid outage). Troubleshoot using the guide below.

> The total power load matters, and it adds up fast: a kettle, toaster, large fridge, TV, iron, and a few lights may exceed the backup circuit's allowable power delivery.

INDICATION	PROBABLE CAUSE	ACTION
No power on any backup circuit (during a grid outage)	BATTERY SYSTEM DC isolator is OFF (down)	Turn BATTERY SYSTEM DC isolator ON. Contact your installer if you suspect the Battery System DC isolator is tripping. 
	One or more Enclosure Isolators are OFF (to right)	Turn all Enclosure Isolators ON (to left). 
	Battery is depleted.	On a partly cloudy day, minimise the loads on the backup circuits—the inverter shuts down if demand exceeds the supply available from solar e.g. when the panels are shaded. Otherwise, wait for grid power to be restored.
	Battery depletes prematurely.	As above, and contact your installer if you suspect the battery is not charging correctly. Also ensure all Enclosure Isolators are ON (to left).
The House Backup Circuit isolator is tripping	Faulty appliance, overload, or electrical fault.	Identify and deactivate any suspect or excess appliances. Reset the house Backup Circuit isolator at the switchboard. **If the problem persists, contact your installer for assistance.**
The Inverter BACKUP AC isolator has tripped	The inverter Backup circuit was overloaded	Reset the BACKUP AC isolator (move up). If it trips immediately, minimise loads on the backup circuits and try again. 
The Inverter BACKUP AC isolator trips repeatedly.	A more complex problem exists.	Place the inverter in Bypass mode (up). This supplies power to the backup circuit from the switchboard. **Contact your installer.** 
Solar Supply Main Switch trips	There is a wiring or inverter fault.	**Contact your installer for assistance.** Note: The Solar Supply Main Switch is usually located on the main switchboard.

12.2 Inverter unexpected shutdown

The inverter may shut down or isolate itself from the grid if it detects circumstances that may cause damage to the inverter or batteries; or create an unsafe situation. Incident causes can be diagnosed by examining the data available on the portal. Unexpected shutdowns may occur due to:

CAUSE	RELEVANT CHARTS FOR DIAGNOSIS (IN PORTAL)	COMMENT
Continuous Backup Load exceeds 4600W.	Backup Load- Power	May occur when too many devices are active on the backup circuit.
Backup Load exceeds 6900W for more than 10 seconds.	Backup Load- Power	May occur with too many devices or when a high start-up current device turns on.
Backup Load exceeds available Battery + Solar power.	Backup Load- Power; Battery- Power; PV- Power	
If internal temperature is greater than 60˚C.	Inverter- Temperature Battery Cabinet-Temp.	Output is reduced above 45˚C.
Grid supply is not of acceptable quality, as defined by AS/NZS 4777.2.	Grid- Voltage Grid- Frequency Grid- Status	The EMS and backup circuit will operate if power is available from PV or batteries. Ask your installer or electricity provider to investigate if grid supply is frequently poor.

12.3 Internet connection problems

Occasionally, your inverter may lose internet connection and be reported as “offline”. Ethernet connected systems usually self-repair after a system restart. Wi-Fi problems usually require that the system is re-onboarded. The most common causes of “offline” reports are:

INDICATION	CONNECTION AFFECTED		REMEDY
	Ethernet	Wi-Fi	
Change of Internet Service Provider e.g., Telstra, Optus, TPG, Dodo etc	✓	✓	Ethernet: Restart the system. Wi-Fi: Restart the system and re-onboard.
New router or modem	✓	✓	
Change of Network name or SSID	✓	✓	
Changed settings in router or modem	✓	✓	
Changed Wi-Fi or Network password		✓	Wi-Fi: Restart and re-onboard
Too many users or devices on your home Wi-Fi network		✓	Limit users or devices; upgrade Wi-Fi router; connect inverter using ethernet.
Wi-Fi signal is weak or variable due to obstructions or distance between the inverter and your Wi-Fi router’s antenna.		✓	Experiment with Wi-Fi router locations; use a Wi-Fi extender; connect using ethernet.
Attempting connection to a 5Ghz Wi-Fi network		✓	This equipment is not compatible with 5Ghz Wi-Fi networks. Use a 2.4Ghz network or ethernet.

12.4 Earth fault alarm

If the Redback system detects an earth fault:

1. An audible alarm will sound in the inverter.
2. The System Error LED will be solid (see also page 26).
3. An email will be sent to Redback customer service, the registered installer, and the system owner.

An email is also sent when the alarm is cleared.

12.5 Inverter Status LEDs

Your Redback inverter is equipped with an LED array to indicate system status and aid diagnosis.
The table below lists LED indications, probable cause, and rectification steps you can try yourself. Refer to page 9 to identify controls.
If the problem is not solved contact your installer for assistance.

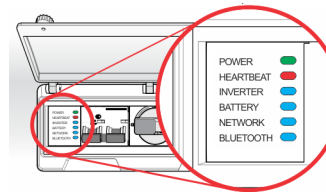
LED NAME	COLOUR & PATTERN	MEANING AND OR PROBABLE CAUSE		SOLUTION(S)	
SYSTEM READY		System ready		☺ OK. No action required.	
		System starting		Wait up to 15 minutes after a restart- this may be normal behaviour. The system may cycle several times during start-up. Completion of start-up process is indicated by the LED stabilising to ON.	
		Grid is not available		Check the **UTILITY GRID** LED	OFF: Grid is not connected. Turn grid isolators ON.
					FLASHING: Contact your installer
		PV or batteries are not installed or are connected correctly.		During daylight, check **SOLAR ARRAY** LED	OFF: Turn PV ARRAY DC isolator ON (clockwise to 12 o'clock).
					ON: PV is detected.
				Check **BATTERY** LED	OFF, and batteries are installed: Turn BATTERY SYSTEM DC isolator ON (up).
		System is not operating		Contact your installer if LED remains OFF for more than one minute following a restart.	
SOLAR ARRAY		**Array 1**	**Array 2**		
		Active	Active	☺ OK. No action required. Both arrays are active.	
		Active	Not Active	If only one array is installed, the other array will indicate as Not Active. Contact your installer if you have two arrays installed.	
		Not Active	Active	At night, both Arrays indicate Not Active.	
		Not Active	Not Active	Ensure PV ARRAY DC isolator is ON (clockwise to 12 o'clock). At night, both arrays indicate Not Active.	
UTILITY GRID		Grid active and connected		☺ OK. No action required.	
		Grid is active but not connected		This may be normal behaviour after a restart- wait up to 90 seconds. The LED stabilises to ON when connected.	
		Grid power does not comply with AS4777.2		The inverter checks the grid quality prior to- and after connection and will disconnect if Grid voltage, frequency or harmonics are outside the allowable range.	
		Grid is not active		Normal behaviour during a Grid outage. If grid is available:	
				Turn grid isolators ON.	
ENERGY FLOW		Consuming energy from grid (a.k.a. buying)		☺ No action required- this is normal operation. When (Instantaneous PV + Battery power) exceeds House Demand, the shortfall is met by the grid. *If Batteries are not fulfilling house demand as expected, contact your installer.*	
		Sending energy to grid/zeroing		☺ No action required- this is normal operation: The house demand is being fulfilled by the battery and or PV.	
		Supplying energy to grid (a.k.a. selling)		☺ No action required: this is normal operation. Power is exported to the grid when PV exceeds (Battery charging + House demand). *Contact your installer if this is unexpected behaviour e.g. exporting while the battery is not full and not charging.*	
		Grid not connected or system not operating		Check **UTILITY GRID** LED.	OFF: Turn grid isolators ON.
					ON: Contact your installer or Redback.

LED NAME	COLOUR & PATTERN	MEANING AND OR PROBABLE CAUSE	SOLUTION(S)
BACKUP POWER		Backup is ready	☺ OK. No action required: battery power is available for the backup circuit. This response may take up to 10 minutes after a restart.
		Backup is off / no power available	Contact your installer.
BATTERY		Battery is charging	☺ OK. No action required. Contact your installer if this is unexpected behaviour.
		Battery is discharging	
		Battery is below "Minimum SoC" setting	Wait for the battery to charge to a value above the Minimum SoC. Contact your installer if the indication persists.
		Batteries not active	Ensure BATTERY SYSTEM DC isolator is ON (up).
SYSTEM ERROR		Ground fault alarm.	An audible alarm will be heard, indicating the Ground Fault has continued for more than one minute. The fault is confirmed by notifications on email and the Redback portal. Contact your installer as soon as possible.
		Other error (no audible alarm).	Wait 10 minutes. System errors may be caused by temporary external factors, such as grid power quality, and may resolve without intervention. If the error does not resolve within 10 minutes, restart the inverter (9.4). If the error does not resolve following a restart: • Move the Bypass switch to the UP position- this maintains continuous grid supply to the backup circuit. Note: backup function will be halted. • Contact your installer as soon as possible.
		Backup circuit overload (exceeds 4.6kW continuous or 6.9kW for 10s, at <45°C)	Reduce simultaneous plug-in loads on the backup circuit. Contact your installer if overloads persist.
			Ensure plug-in devices on the backup circuit are in accordance with section 8.5.
		No fault	☺ OK. No action required.
COMMUNICATIONS		The Communications LED is controlled by the EMS. If the EMS is not operational, the LED will remain in the last known state.	
		Online	☺ OK. Connected to the Redback cloud. No action required.
		Cannot connect to the Redback cloud	Internet connection lost. Ensure the local network is operating correctly.
		Onboarding required. BT available.	Inverter is Bluetooth (BT) discoverable. Connect your phone to begin onboarding.
			Bluetooth connection established. Continue onboarding.
		Onboarding required. BT timed out	Restart Bluetooth. Set the Bypass switch to the middle position for 5 seconds then return to the original position. Bluetooth times out after 30 minutes of inactivity.
		No active comm's (local network not connected)	Ensure the local network is operating correctly. *Changes to router or passwords will require re-onboarding.*
			If communications do not re-establish, restart the EMS (section 9.3).
			If communications do not re-establish within 10 minutes of a EMS restart, re-onboard the inverter (section 11).

LEGEND: OFF ON Flashing Double Flash

12.6 EMS Status LEDs

The EMS controls the inverter functionality, and all internal and external communications. The EMS a.k.a. Control Board is located inside the Balance of System (BoS). The EMS Status LEDs are visible in the BoS Switchgear Hatch.



The table below lists EMS LED indications, probable causes, and rectification steps you can try yourself. Refer to page 9 to identify controls.

If the problem is not solved contact your installer for assistance.

A note about EMS Labels

In 2018, the EMS LED labels were updated: the unused 4G LED was repurposed for Bluetooth notification, and the Wi-Fi LED was renamed to Network. There were no other changes to the EMS.

In this document "Network LED" means the Network LED or the Wi-Fi LED, and "Bluetooth LED" means the Bluetooth LED or the 4G LED. Your inverter and software work the same regardless of the labels.

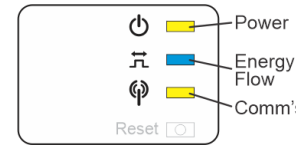
LED	COLOUR & PATTERN	MEANING AND OR PROBABLE CAUSE	SOLUTION(S)
ALL LEDs OFF POWER HEARTBEAT INVERTER BATTERY NETWORK BLUETOOTH		No power available	Inverter is isolated from grid supply. Turn grid supply isolators ON. Grid outage is occurring, and no PV or backup power exists. Wait for grid or PV power to be restored. Bypass switch is incorrectly set. Try the Bypass switch in the UP and DOWN positions- the EMS should power up from grid or battery, if available.
ALL LEDs ON POWER HEARTBEAT INVERTER BATTERY NETWORK BLUETOOTH		EMS is in start-up phase	Wait 2 minutes. EMS should stabilise to: Power ON ; Heartbeat flashing ; Inverter ON . If all EMS LEDs remain ON, restart the EMS. Set Bypass switch to the middle position for 5 seconds then return to the original position. Wait 2 minutes.
POWER		EMS has power	☺ OK. No action required.
		EMS does not have power	See ALL LEDs OFF, above.
HEART BEAT		OK	☺ OK. No action required. EMS is running normally.
		EMS is frozen or updating	Wait 5 minutes. If no change, restart the EMS (section 9.3).
		No power	See ALL LEDs OFF, above.
		Inverter is off	Start inverter (section 0).
INVERTER		OK	Wait 5 minutes. Settings are being applied.
		OK	☺ No action required. EMS is connected to inverter.
		EMS is not connected to the inverter	Contact your installer.

LED	COLOUR & PATTERN	MEANING AND OR PROBABLE CAUSE	SOLUTION(S)
BATTERY		Battery detection error	Restart the EMS (section 9.3).
		OK	☺ OK. No action required. The EMS & BMS are communicating.
		System is configured with “zero” batteries	If your system has batteries, request your installer to update the configuration.
NETWORK		OK	☺ OK. No action required. Connected to the Redback Cloud.
		Connected to local network but Redback Cloud not found	Ensure the local network is internet connected.
			Log in to https://portal.redbacktech.com
			Login success: The Redback Cloud is available- therefore the home network is probably preventing the inverter from connecting to the internet. Review your home network and or firewall settings.
			Login failure: Indicates a Redback server issue. Contact Redback for advice.
		Inverter not connected to local network	Ensure the local network is operating correctly.
			Re-onboard the inverter (section 11.2).
BLUE TOOTH		Bluetooth is discoverable	If required, connect to the inverter using your phone and the Redback app.
		Bluetooth is connected	Proceed with onboarding or setup (section 11.2).
		Bluetooth OFF	BT deactivates 30 minutes after EMS restart. Restart the EMS to activate discoverable Bluetooth (section 9.3).

LEGEND: OFF  ON  Flashing

12.7 SM3000 Smart Meter diagnostics

The Redback SM3000 Smart Meter is usually located at the main switchboard. It detects the grid energy traffic of up to 3 phases and indicates if the site overall is importing or exporting energy to the grid. This information informs inverter operation.



NAME	COLOUR & PATTERN	MEANING
Power		ON: Meter has power.
		OFF: Meter does not have power or has failed.
Energy Flow		ON: Site is consuming energy from the grid.
		Flashing: Site is exporting energy to the grid.
		OFF: Energy flow is not detectable.
Comm's		Flashing: Transmitting data.
		5x Flash: Reset in progress.

13. Maintenance

13.1 Schedule

WARNING: ELECTROCUTION HAZARD. Lethal voltages may be present. Isolate all sources of power and test before removing covers.

Your Redback SH5000 is a low maintenance product. You can undertake the minor annual maintenance identified below. Internal maintenance must be conducted by a qualified person, such as your installer.

Note: Filters, fans and heatsink fins may require more frequent cleaning in dusty conditions.

ITEM	NAME	REASON	PROCEDURE	BY SERVICE PERSON	BY OWNER
1	Battery Enclosure vents, filters, and fan blades.	Airflow is reduced when dust accumulates on the vents or the filter is clogged. The lower intake vents are more likely to be affected.	See section 13.2.	☑	☑
2	Cabinet	Cabinet may become soiled.	Wipe down outside of cabinet with a just-damp cloth. Immediately wipe dry with a microfibre cloth. Do not use cleaning agents as they may damage the finish.	☑	☑
3	Inverter heatsink fins	Cooling efficiency reduces when dust, dirt or debris accumulate on the heatsink.	Clean the heatsink fins using a small brush, cloth or compressed air.	☑	☒
4	Battery connections	Battery efficiency may reduce if connections or terminals become dirty or corroded.	Unplug and inspect battery cable connections. Remove corrosion or debris. Spray with contact cleaner.	☑	☒
5	Cabinet seals	Concealed seals ensure cabinet water resistance.	Remove covers and inspect seals for hardening, tears or other damage. Look for signs of water in cabinets.	☑	☒
6	Cable seals	Cable seals prevent water and insects entering the inverter.	Remove BoS Front Cover and tighten all cable glands and waterproof caps.	☑	☒

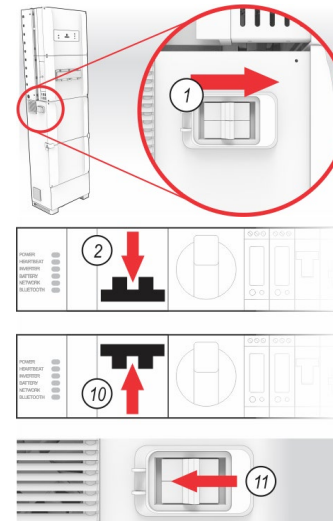
13.2 Cleaning the Battery Enclosure fan filters

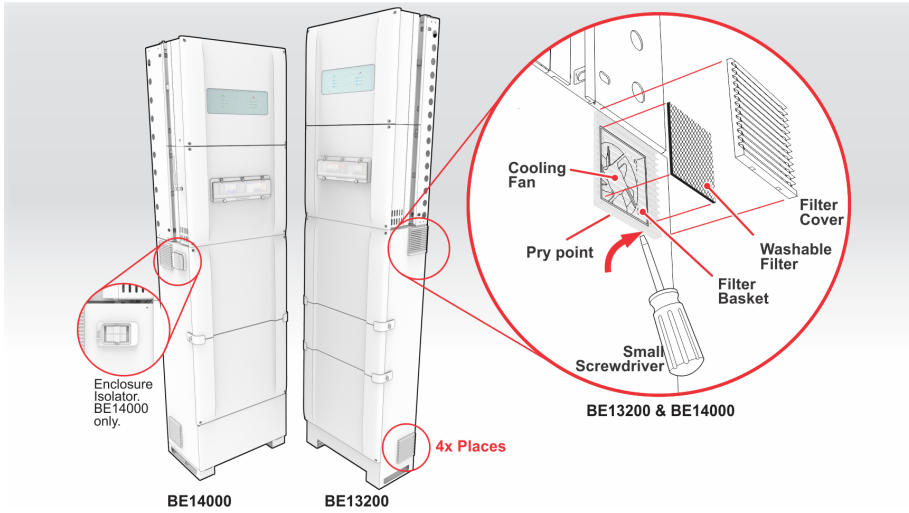
Occasionally, it is necessary to clean the battery enclosure filters and filter covers. There are four filters in total, two at each side of the enclosure.

> TIP! Do this job early in the morning or at night, when the fans are unlikely to be running.

To clean the filters:

1. If fitted, switch the Battery Enclosure isolator OFF
2. Turn BATTERY SYSTEM DC isolator OFF (down).
3. Fans are installed in the upper vents only and will operate if the batteries are hot. Ensure the fans are off before accessing the upper vents. While waiting, you can start work on the lower vents.
4. Using a small screwdriver or similar tool, pry the filter covers from the filter baskets- there are two pry points at the lower edge of the cover.
5. Brush, wipe or vacuum any dust or debris from covers.
6. Remove the filters from the baskets. Wash in cold soapy water, rinse and squeeze out excess water. Lay flat to dry.
7. Inspect the fan blades. Remove heavy dust build-up with a brush, cloth, or vacuum cleaner.
8. Refit the filters to the baskets.
9. Refit the filter covers, ensuring the vents face downward. There should be two tactile “clicks” as the snap-fits engage.
10. Turn the BATTERY SYSTEM DC isolator ON (Up).
11. Switch the Battery Enclosure isolator ON (to the left).





14. Specifications

PV PORT	Version 022x	Version 024x
Number of MPPTs	2	2
Strings per MPPT Input	1/1	1/1
MPPT Operating Voltage (range)	DC 125 - 550V	DC 125 - 550V
MPPT Full Load (range)	DC 215 – 500V	DC 190 – 500V
Maximum Input Voltage (Vmax)	DC 580V	DC 580V
Maximum Current (Imp)	DC 11/11A	DC 14/14A
Short Circuit Current (Isc)	DC 13.8/13.8A	DC 17.5.17.5A
Maximum Feedback Current	0A	0A
Decisive Voltage Class (DVC)	DVC-C	DVC-C
GRID INTERACTIVE PORT	**All versions**	
Nominal Output Voltage	AC 230V	
Nominal Output Frequency	50 Hz	
Rated Output Current	AC 24.5A	
Max. Output Current	AC 24.5A	
Rated Output Active Power	AC 5000W	
Rated Output Apparent Power	5000VA	
Rated Input Current	AC 40A	
Rated Input Apparent Power	9200VA	
Power Factor (range)	0.8 lagging to 0.8 leading	
Output Voltage THD	<4.5%	
Inrush Current	60A, 3 µs	
Maximum Output Fault Current	43A, 0.2s	
Maximum Output Overcurrent Protection	60A, 3 µs	
Decisive Voltage Class (DVC)	DVC-C	
BACKUP PORT		
Nominal Output Voltage	AC 230V	
Nominal Output Frequency	50 Hz	
Rated Current	AC 20A	
Rated Active Power	AC 4600W	
Rated Apparent Power	4600VA	
Peak Apparent Power	6900VA (10 sec max)	
Power Factor (range)	0.8 lagging to 0.8 leading	
Output Voltage THD	<4.5%	
Inrush Current	55A, 2µs	
Maximum Output Fault Current	43A, 10s	
Maximum Output Overcurrent Protection	30A	
Decisive Voltage Class (DVC)	DVC-C	
BATTERY PORT		
Voltage (nominal)	DC 40 - 60V	
Max. Current (charge)	DC 90 A	
Max. Power (charge)	DC 4600W	
Max. Current (discharge)	DC 100A	
Max. Power (charge)	DC 4600W	
Battery Type	Li-ion	
Battery Depth of Discharge	90%	
Short Circuit Current	1600A	
Decisive Voltage Class (DVC)	DVC-A	

GENERAL INFORMATION	
Operating Temperature Unconditioned without solar effects	-25°C to 60°C
Operating Temperature Derated Output	below 10°C and over 45°C
Operating Relative Humidity	0 - 95%
Operating Altitude	0 - 3000m
Protective Class	I
Ingress Protection Rating	IP65
AC Overvoltage Category	OVC III
DC Overvoltage Category	OVC II
Active Anti-islanding Method	Active Frequency Drift
Moisture Location Category	4K4H
External Environment Pollution Degree	Grade 1, 2 and 3
Inverter Topology	Non-isolated
Country of Origin	China
Demand Response Modes	DRM 0
Standby Self-Consumption	<13W
Noise Emissions	<30 dBm
Warranty	10 Years
EFFICIENCY	
Maximum Efficiency	97.60%
Maximum Battery to Load Efficiency	94%
European Efficiency	97%
PHYSICAL DATA	
Installed Weight (including SH5000, BE14000 and Batteries)	132-203kg
Dimensions (including PCE and BoS) (W x D x H)	518 x 360 x 840mm
Material	Aluminium
Finish	Sealed and powder coated
BE14000 Smart Hybrid Battery Enclosure Data	
Number of Battery Units	2 to 4
Storage Capacity	4x 2.4kWh or 4x 3.55kWh
Battery System Model	US2000 or US3000
Maximum Capacity	14.2kWh
Nominal Voltage	DC 48V
Rated Current	DC 100A
Fan Specification	DC 48V / 0.13A x2
Protective Class	I
Ingress Protection Rating	IP54
Dimensions (W x D x H)	545x348x1125 mm
Material	Steel
Finish	Sealed and powder coated

ISOLATORS	PV PORT	GRID INTERACTIVE PORT	BACKUP PORT	BATTERY PORT	BATTERY CABINET
Manufacturer Part Number	XBE+3410/2	S201M-C40	S201-C25	NDB1-125	NDB1-125
Rated Insulation Voltage	1100V	440V	440V	500V	500V
Rated Impulse Withstand Voltage	8kV	4kV	4kV	4kV	4kV
Suitability for Isolation	C	C	C	C	C
Rated Operational Current	16A	32A	25A	125A	125A
Utilisation Category	DC-PV2	A	A	A	A
Rated Short-time Withstand Current (Icw)	700A	NA	NA	NA	NA
Rated Short-circuit Making Capacity (Icm)	1000A	NA	NA	NA	NA
Rated Breaking Capacity (Isc)	5kA	15kA	10kA	10kA	10kA

COMMUNICATIONS PORTS AND PROTOCOLS	
Ethernet	RJ45; Straight-thru
DRED	RJ45; DRED
Relays	RJ45; 4x Digital I/O; +DC5V & GND
kWh Meter	RJ45; RS485 MODBUS
RS485	RJ45; Factory Use Only
WiFi	802.11b/g/n/ac; 2.4GHz
LTE	NA
Interlock	NA

USER INTERFACE	
Front Panel Display	Coded, coloured LEDs
Communications	Bluetooth for commissioning; Wi-Fi or ethernet for remote access
Remote access	Web Portal or MYRedback app (Android or iOS)
Remote Firmware Updates	Supported
Power/energy monitoring	Includes 1 x utility grade energy meter (class 1)

CERTIFICATIONS, STANDARDS AND APPROVALS			
AS/NZS 4777.2:2020	IEC 62116:2014	IEC 60529	RCM
IEC 62109-1:2010	EC 62040-1:2017	EN 61000	CE Mark (LVD, EMC, RoHS directives)
IEC62109-2:2011	IEC 62477-1:2012		

DESIGNED WITH INSTALLATION STANDARDS CONSIDERED		
AS/NZS 3000:2018	AS/NZS 5139:2019	AS/NZS 5033:2014 (inc. Amd 1 & 2)

15. Redback installation details

SUPPLIER	INSTALLER
Company:	Company:
Address:	Address:
Contact person:	Installer name:
Telephone:	Telephone:
Email:	Email:
Date Installed:	

INSTALLATION DETAILS	YES	NO	Model	Serial Number
Redback Inverter	☒	☐	**SH5000**	
Primary Battery Enclosure	☐	☐		
Secondary Battery	☐	☐		
Battery 1	☐	☐		
Battery 2	☐	☐		
Battery 3	☐	☐		
Battery 4	☐	☐		
Battery 5	☐	☐		
Battery 6	☐	☐		
Battery 7	☐	☐		
Battery 8	☐	☐		
Backup circuit	☐	☐		
Relay 1	☐	☐		
Relay 2	☐	☐		
Relay 3	☐	☐		
Relay 4	☐	☐		