

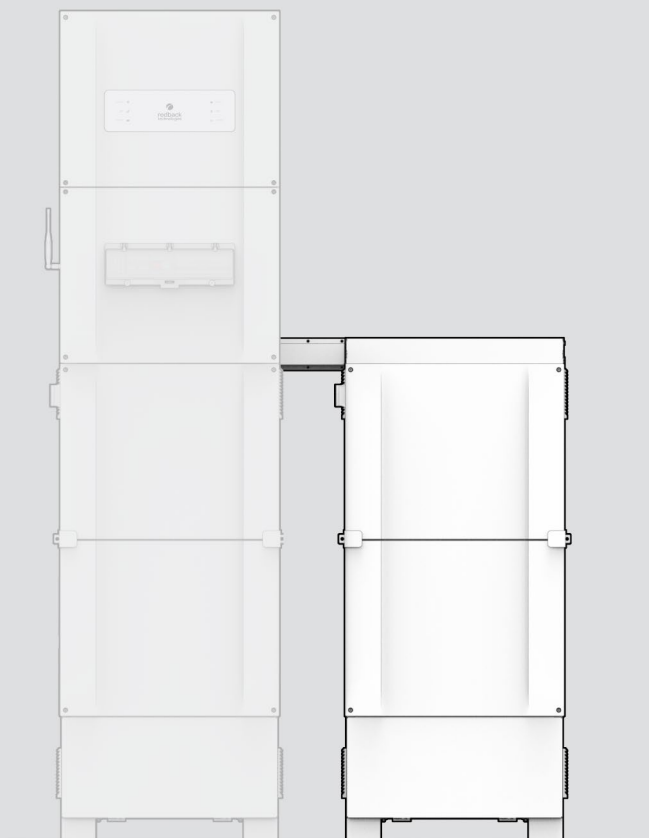


Installation Manual

Redback Smart 3-Phase Hybrid System

BE14000-HV Connection Kit and Secondary Enclosure

v2.0



HISTORY

VERSION	ISSUED	COMMENTS
1.0	24-Apr-20	First edition
1.1	06-Jul-21	AS5139 Diagrams redrawn; Minor edits.
1.2	02-Dec-21	Rebrand, update SLD and Specifications table.
1.3	05-Jan-22	Update specification table.
1.4	04-Mar-22	Wi-Fi compatibility updated; Added "start here" foreword.
2.0	09-May-23	P5,15,16,22 Cooling zone increased to 150mm was 100mm. P9 Add limitation: untested for multi-inverter installations; Add backup circuit design notes. P9, 31 Add backup output limits for 4 or 8 battery systems. P17-20 Update Single Line Drawing adding Solar Supply Main Switch MCB Type C 32A. P25 Add requirement for, when adding or replacing batteries, all batteries must be balance charged and firmware updated. P31 Add version 0314; Add "Maximum PV Input Power"; Add I_{sc} Max and footnote; DONE Correct Battery Port > Max.Power (discharge) (was charge). P32 Qualify inverter only noise emissions; Add BE Noise emissions and footnote; Add Fan rating; Review applicable standards. P35 Reformat table and relocate Close-up & Handover.

CONTACT INFORMATION

Phone: 1300 240 182
International phone: +61 7 3180 2325
Address: Building 1015, 80-120 Meiers Rd, Indooroopilly QLD 4068, Australia
Email: customersupport@redbacktech.com
Website: redbacktech.com

NOTICE OF COPYRIGHT

Installation Manual Redback Smart 3-Phase Hybrid System BE14000-HV Connection Kit and Secondary Enclosure ©2022 Redback Technologies.

All Rights Reserved. This work is copyright, apart from any use permitted under the Copyright Act 1968. No part may be reproduced by any process, nor may any other exclusive right be exercised without the permission of Redback Operations Pty Ltd.

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.

Start here...

This manual describes the procedure to add a second BE14000-HV Battery Enclosure (hereafter called the BE14000-HV or the “Enclosure”) to an existing Redback ST10000 (hereafter called the ST10000 or the “Inverter” or the “System”) + BE14000-HV Smart 3-phase Hybrid system, using the Redback BE14000-HV Connection Kit (hereafter called the “Connection Kit”).

This is the only approved method to expand a ST10000 system. This procedure does not apply to any other Redback product.

The addition of a secondary enclosure enables the system storage capacity to be increased up to 28.8kWh, depending on the quantity and type of batteries selected.

The connection kit has all the parts needed to install the secondary enclosure up to 500mm to left or right of the existing system, if permitted by AS5139. The location of the secondary enclosure more than 500mm away will require the fabrication of cables, and supply of suitable ducting.

This manual is for use by Installers and Installer Companies.

Before you go to site...

1. Read this manual.

The installation manual has all the information you will need for most installation scenarios.

2. Book a support call

If you think you will need assistance, book Redback Technical Support 2 days before going to site. This ensures that technical support is reserved for you if you are on-site and need help. Redback support is in Brisbane, Australia and is available 8am-4pm (Brisbane time) Monday to Friday. There are three ways to book a support call:

Web: redback.link/support

SMS: +61 417 632 065

Call from Australia: 1300 240 182

Call from New Zealand: +61 7 3180 2325

3. Register the installation

Early registration makes it possible to do a functional, testable installation even if some information is not available e.g., installation in a spec home where the owner's information is not available. You can also pre-assign the installation inspector.

Register the installation at redback.link/register (+Add device).

Need something else?

1. Visit the Redback Document Library

Installer and Owner documentation is available for our current products. Go to redback.link/docs

2. Contact the Redback Customer Support Team (Monday to Friday, 8am-4pm AEST)

In Australia: 1300 240 182

In New Zealand: +61 7 3180 2325

Email: customersupport@redbacktech.com

Contents

1. Introduction	5
1.1 Know your product	5
1.1.1 Dimensions, weights & configurations	5
1.1.2 Major components	6
1.1.3 Status Panel LEDs	8
1.1.4 BoS switchgear	8
1.1.5 EMS LEDs	8
1.2 Compatibility and limitations	9
1.3 Backup circuit design notes	9
2. Installation	10
2.1 Installation overview	13
2.2 Guide to AS5139 installation requirements for a secondary BE14000-HV	14
2.2.1 Installation on an exit path	14
2.2.2 Installation on a blank wall	15
2.2.3 Installation near a corner	15
2.2.4 Installation with a low ceiling	16
2.2.5 Installation near a corner, with low ceiling	16
2.3 Shutdown the system	21
2.4 Prepare the BoS	21
2.5 Installing the secondary BE14000-HV Battery Enclosure	22
2.5.1 Installation notes	22
2.5.2 Pre-assembly	22
2.5.3 Battery Enclosure Installation	22
2.5.4 Connection kit installation	23
2.5.5 Connect secondary enclosure to BoS/BMS	24
2.6 Battery installation	25
2.6.1 Preparing Pylontech batteries	25
2.6.2 BMS cable connections	26
2.6.3 Battery power and connections	27
3. Commissioning	28
3.1 Restart the inverter	28
3.2 Start the Pylontech batteries	28
3.3 Connect RedbackINSTALL to the inverter	29
3.4 Confirm configuration success	29
4. Maintenance	30
5. System Specifications	31
6. Getting help, related links, and latest documents	33
7. Close-up and handover	35
7.1 Close-up	35
7.2 Handover	35

1. Introduction

This manual describes the procedure to add a second BE14000-HV Battery Enclosure to an existing Redback ST10000 + BE14000-HV Smart 3-phase Hybrid system, using the Redback BE14000-HV Connection Kit.

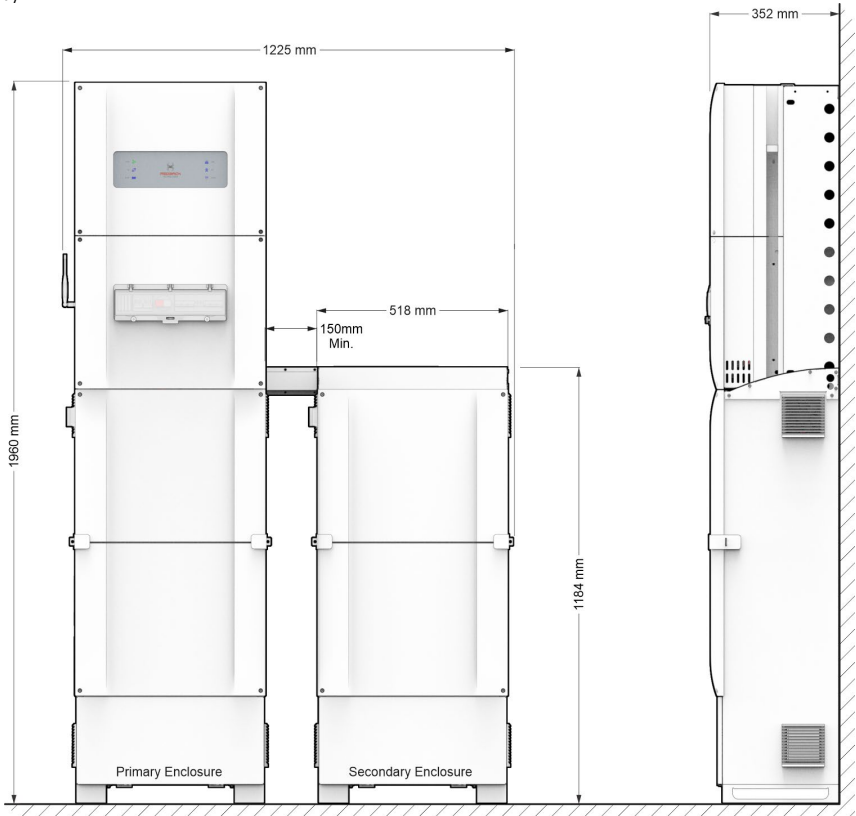
This is the only approved method to expand a ST10000 system. This procedure does not apply to any other Redback product.

1.1 Know your product

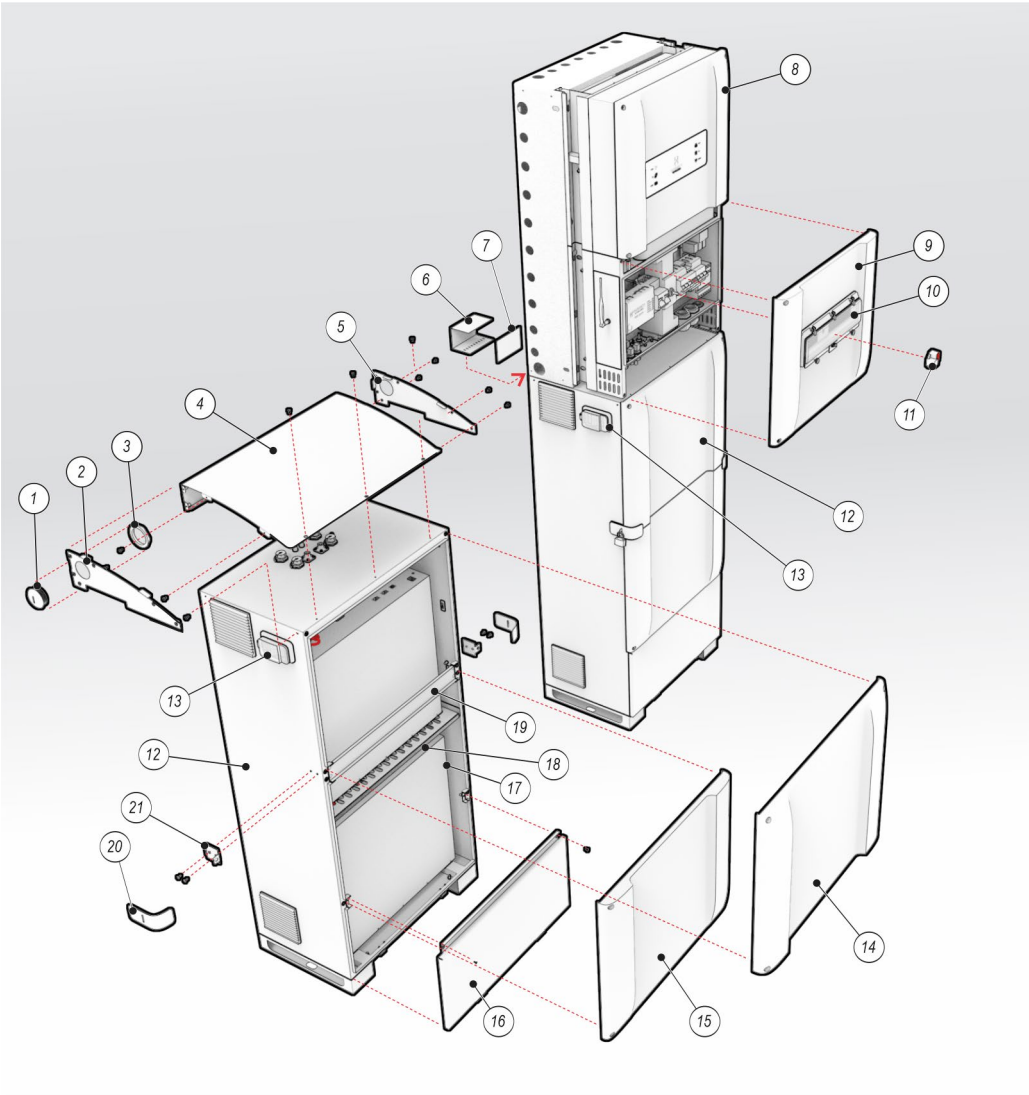
1.1.1 DIMENSIONS, WEIGHTS & CONFIGURATIONS

Item	Width (mm)	Height (mm)	Depth (mm)	Shipping Mass (kg, ea.)	Component Mass (kg, ea.)
Battery Enclosure	518	1125 min	352	46.5	36.5 [●]
Connection Kit	520	85	315	4.5	3
Combined (2 Enclosures [◆])	1225 [■] ◆	1960 typ [♦]	352	-	-
BATTERIES[♣]					
Pylontech H48050 2.4kWh	442	390	100	24.0	22.5
Pylontech H48074 3.55kWh	442	390	132	34.0	32.0

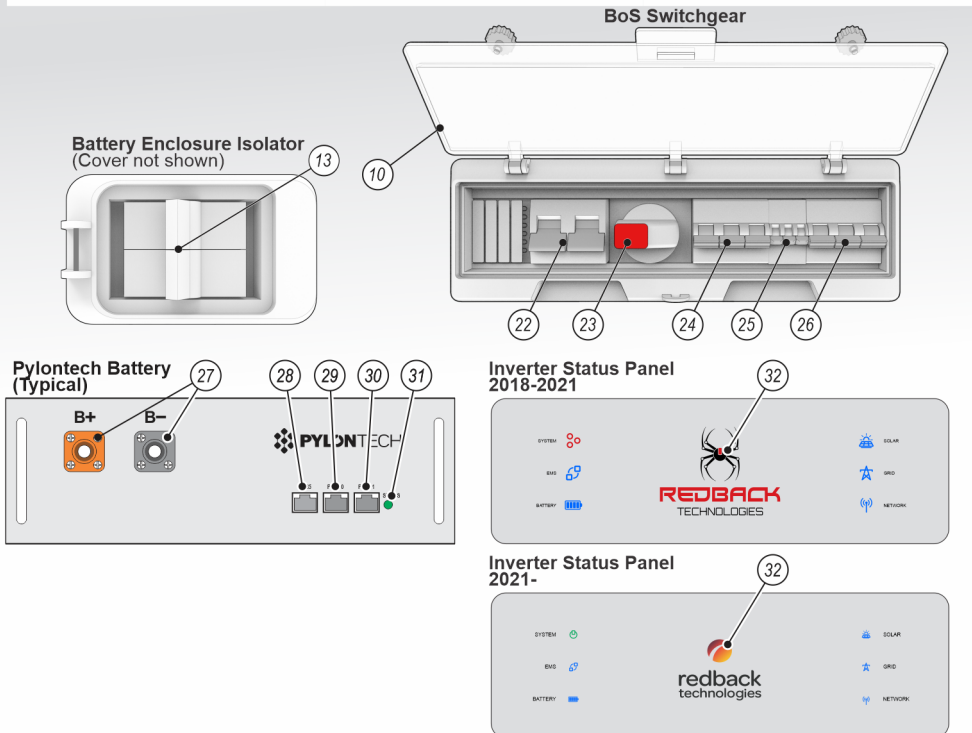
●Excluding batteries. ■Includes Wi-Fi antenna and padlock hoops and minimum 150mm clearance between enclosures. ◆May vary slightly due to installation variation ♦2nd enclosure may be installed to left or right of existing installation ♣For guidance only- weights may vary slightly.



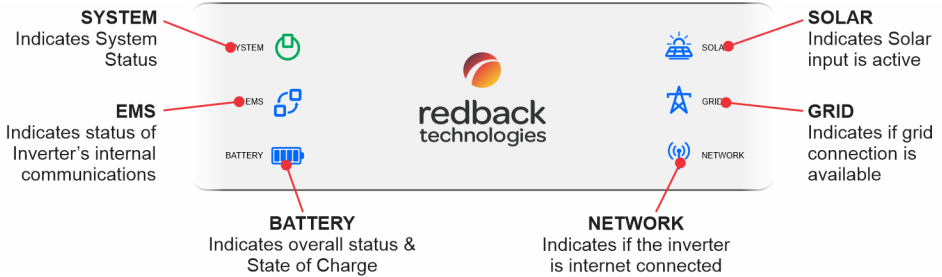
1.1.2 MAJOR COMPONENTS



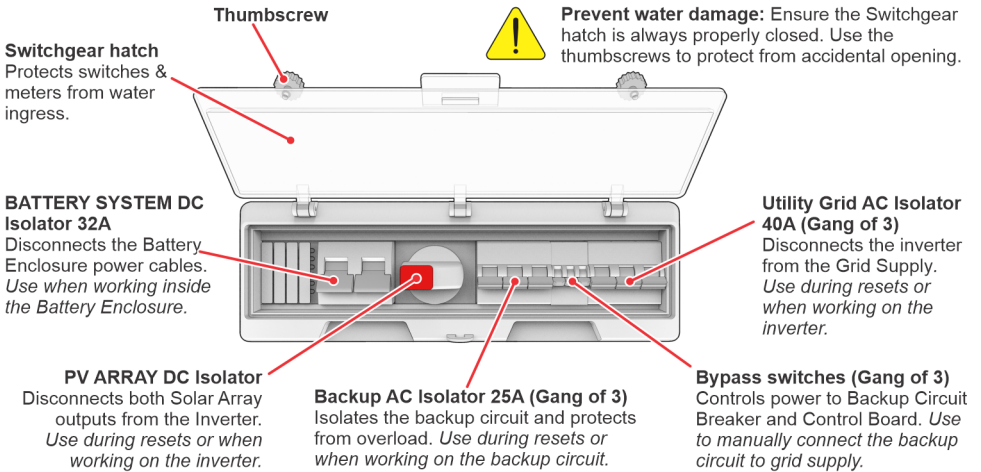
#	Part name		
1	40mm cover	12	Battery Enclosure (BE)
2	Connection Kit LHS cover	13	BE isolator switch cover
3	40mm nut	14	BE upper front cover
4	Connection Kit top cover	15	BE lower front cover
5	Connection Kit LHS cover	16	BE kick panel
6	Cable duct 500mm	17	Battery (4 required)
7	Cable Cover 500mm	18	Battery shelf
8	Inverter status panel	19	BE cross brace
9	BoS front cover	20	Security clamp
10	BoS switch panel cover	21	Padlock hoop
11	PV Isolator Knob	22	Battery System DC isolator
		23	PV Array DC Isolator
		24	Backup AC Isolator
		25	Bypass Switch
		26	Utility Grid AC Isolator
		27	Battery Power Terminals
		28	Battery RS485 Port
		29	Battery Port 0
		30	Battery Port 1
		31	Battery Status LED
		32	Reset Switch (concealed)



1.1.3 STATUS PANEL LEDS

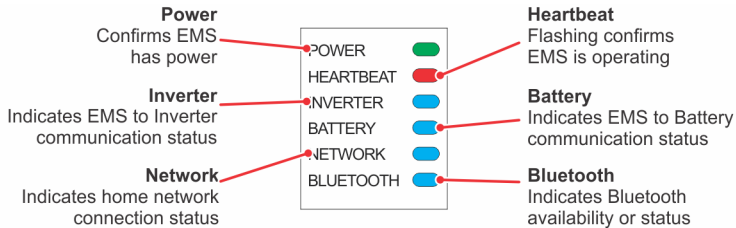


1.1.4 BOS SWITCHGEAR



1.1.5 EMS LEDS

The Redback Energy Management System (EMS) is the inverter's internal control system. LEDs provide a guide to its state and activity.



1.2 Compatibility and limitations

The Redback BE14000-HV and Connection Kit add extra storage capacity to an existing ST10000 and BE14000-HV system. This upgrade is not permitted:

- If the modified system will be unable to comply with the requirements of AS5139-2019.
- Using batteries of a different model to those already fitted except if all batteries are to be replaced in which case all batteries must be the same model (Pylontech H48050 or H48074) i.e., no mixing battery models.
- In off-grid installations, where there is not normally a grid connection.
- In full-sun locations: the inverter may overheat resulting in reduced efficiency and or automatic shutdown.
- In locations without internet access: it may not be possible to update the system configuration.
- Exposed locations where wind driven rain may penetrate the enclosure.
- For use with generators.
- For connection to 5Ghz Wi-Fi networks.



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



WARNING. Installation in violation of these limitations may void the warranty (refer to the Warranty document).

Multiple inverter energy systems:

- ST10000 systems have not been tested for Section 5 of AS4777.2:2020—installation of ST10000s in a multiple inverter energy system requires they are installed & used in accordance with the requirements of AS/NZS 4777.1.

1.3 Backup circuit design notes

The ST10000 includes one Backup circuit per phase, activated during a grid outage and powered by the available PV or system batteries. The backup circuit maximum power is limited by the battery discharge rate i.e., the number of batteries fitted (4 or 8). The battery loads on the backup circuit must be carefully selected in to extend the backup power availability, noting:



WARNING. Batteries must be fitted and active if a backup circuit has been connected. PV-only power is not satisfactory for backup circuits—backup load and PV power are variable and unpredictable—when backup load exceeds PV power the Inverter will automatically shut down and restart.

- As far as practical, loads should be balanced across all three phases.
- For a 4-battery system: continuous battery-only power delivery up to 5kVA max. (total of all three phases, up to 3.3kVA on one phase).
- For an 8-battery system: continuous battery-only power delivery up to 10kVA max. (3.3kVA max. per phase).
- Peak power delivery of 16.5kVA for up to 60 seconds (for high starting currents).
- System self-protects and shuts down if power limits are exceeded.
- Output is reduced above 45°C ambient temperature.
- System shuts down if 60°C ambient is exceeded.

The Backup circuit is suitable for low power or intermittent use devices such as domestic refrigerators; freezers; LED or florescent lighting; small kitchen appliances; computers; radio or televisions.

High starting-current or high operating-current loads must not be connected to the Backup circuit e.g., hot water systems; air conditioners; ovens or cooktops; spas or saunas or pool pumps.

Backup circuit	New circuit needed? ☐ Yes ☐ No		
Backup circuit inclusions		☒ Acceptable	☒ Not Acceptable
	Refrigerators and freezers		Critical medical devices
	Fans		Air conditioners & heaters
	Small, occasional use, plug-in appliances e.g., microwaves, kettles, toasters		Ovens and cooktops
	TVs, radios, telephones		Home theatres & projectors
	Computers, tablets, routers		Hot water systems
	Mobile phone or small device chargers		Spas, saunas, pool pumps
	Soft-start household water pumps		Battery chargers & corded power tools
	Low-energy LED or CCFL lighting		Incandescent or high-power lighting

2. Installation

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.

Audience

Installation, maintenance, and connection of Inverters must be performed by qualified personnel, in compliance with local electrical standards, wiring rules and the requirements of local power authorities and/or companies (for example AS4777 and AS/NZS 3000 in Australia). The Redback Smart Hybrid strictly conforms to all related safety rules in design and test.

Safety regulations relevant to the location should be followed during installation, operation, and maintenance. Improper operation may cause electric shock, or damage property, inverter, or equipment.

These instructions are for use by skilled, qualified personnel who:

- Meet all local and governmental code requirements for licensing and training for the installation of electrical power systems with AC and DC voltage up to 600 volts.
- Have CEC accreditation for installing grid-connected PV systems and energy storage systems.
- Have knowledge of the functional principles and operation of grid-connected systems and knowledge of the installation of electrical devices
- Understand the risk associated with installing and using electrical devices and can implement appropriate risk management strategies.
- During the preceding 12 months, have completed Redback approved training on the installation of the Redback ST10000 Smart Hybrid Inverter and BE14000-HV Battery Enclosure.

Symbols used

SYMBOL	DEFINITION	SYMBOL	DEFINITION
	LETHAL DANGER. Risk of electrocution.		DELAY. Wait specified time.
	DANGER. Risk of electrical shock.		CAUTION! Hazard to equipment
	WARNING! Hazard to human life		WARNING! Burn hazard
	TIPPING HAZARD. Do not leave unattended.		HEAVY LIFT. Seek assistance.



Information. This symbol indicates the information provided is important for the correct installation, operation and or maintenance of the equipment. Failure to follow the recommendations could result in annulment of the equipment warranty.

General safety

SYMBOL	DEFINITION
	WARNING: LIMITATIONS ON USE This equipment is NOT intended for use with life support equipment or other medical equipment or devices.
	CAUTION: EQUIPMENT DAMAGE Only use components or accessories recommended or sold by Redback Technologies or its authorised agents.
	IMPORTANT Do not attempt to install this equipment if it appears damaged in any way. See the Warranty document for instructions on returning the equipment.

Personal safety

SYMBOL	DEFINITION
	WARNING: PERSONAL INJURY
	Use safe lifting techniques when handling this equipment. For guidance visit safeworkaustralia.gov.au or contact your local WHS authority.
	Use standard safety equipment when working on this equipment such as safety glasses, ear protection, steel-toed safety boots, safety hard hats, etc.
	Use standard safety practices when working with electrical equipment e.g., remove all jewellery, use insulated tools, wear cotton clothing etc.
	- Never work alone when installing or servicing this equipment. Have someone nearby that can assist if necessary. - Do not touch the inverter during operation. The temperature of some parts may exceed 60°C during operation. After shutdown, allow the inverter to cool for at least 5 minutes before touching. - Ensure that children, pets, and other animals are kept away from the inverter, solar arrays, battery bank and utility grid components. - If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Battery safety

SYMBOL	DEFINITION
	IMPORTANT - 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.

Equipment safety

SYMBOL	DEFINITION
	WARNING: LETHAL VOLTAGE - Review the system to identify all sources of energy. Ensure all sources of power are disconnected before performing any installation or maintenance on this equipment. Confirm that the terminals are de-energised using a validated voltmeter (rated for a minimum 1000 VAC and 1000 VDC) to verify the de-energised condition. - Do not perform any servicing other than that specified in the installation instructions unless qualified to do so or have been instructed to do so by Redback Technologies technical support personnel. - Solar arrays may be energised even in low ambient light. Install a high voltage DC rated disconnect, circuit breaker, or accessible fuse box to ensure a safe disconnect from the system (depending on local code requirements). - To avoid electric shock, disconnect the DC input and AC input of the Inverter at least 5 minutes before performing any installation or maintenance. - Completely disconnect all sources of power before proceeding with any maintenance. Do not remove the Inverter Upper Front Cover. - Do not tighten the AC and DC terminals or pull on the AC and DC wiring when the Inverter is running.
	WARNING: BURN HAZARD External and internal parts may be hot. Do not remove the cover during operation or touch any internal parts. Be sure to allow enough time for internal parts to cool down before attempting to perform any maintenance.
	WARNING: FIRE HAZARD - Do not keep combustible or flammable materials in the same room as the equipment. The Redback Smart Hybrid contains relays and switches which are not ignition protected. - Ensure AC, DC and ground cable sizes conform to local codes and are fit for purpose. See product manuals for minimum size requirements. Ensure all conductors are in good condition. Do not operate the unit with damaged or substandard cabling.
	CAUTION: EQUIPMENT DAMAGE - When connecting cables from the Inverter to the battery terminals, ensure the proper polarity is observed. Connecting the cables incorrectly can damage or destroy the equipment and void the product warranty. - Thoroughly inspect the equipment prior to energising. Verify that no tools or equipment have been inadvertently left behind. - Ensure clearance requirements are strictly enforced. Keep all vents clear of obstructions that can prevent proper air flow around, or through, the unit. - Do not open the inverter Upper Front Cover. Apart from performing work at the wiring terminals (as instructed in this manual), touching or changing components without authorisation may cause injury to people, damage to the Inverter and annulment of the warranty. - Static electricity may damage electronic components. Take appropriate steps to prevent such damage to the Inverter otherwise the warranty may be annulled. - Ensure the output voltage of the proposed solar array is lower than the maximum rated input voltage of the Inverter; otherwise, the inverter may be damaged, and the warranty annulled. - Solar modules should have an IEC61730 Class A rating.
	CAUTION: LIGHTNING PROTECTION The PV arrays in this system must be protected by a Lightning Protection System compliant with AS/NZS5033:2014.

2.1 Installation overview



Installation by non-approved installers may void the product warranty.

You are approved to install Redback products if you:

- Are a Redback registered and qualified installer, and
- Have a CEC installer's license, and
- Have a Redback Installer login.

Contact Redback on 1300 240 182 if you are unsure of your approval status.

Before going to site:

- Gather required information and tools.
- If your Installer Company did not install the original system, contact the Homeowner to arrange software access to the system.

At site:

- Ensure that the proposed upgrade will comply with AS5139-2019. You may need to change the proposed installation or upgrade the installation's fire protection.

Hardware

- Upgrade the fire protection measures as required.
- Install the new Battery Enclosure and Connection Kit components.



Note: The entire system must become compliant not just the added components.

Electrical

- Complete connections to BoS and BMS module.
- Install batteries and associated cables.

Commissioning

- Update the system configuration using RedbackINSTALL.
- Document the installation.
- Handover to homeowner

Tools required

- Normal electrician's tools including Cat5 cable tools and crimpers.
- Battery drill/driver with 4mm Hex bit; Phillips head screwdriver bit
- Internet connected device with the RedbackINSTALL app

Information required

Inverter serial number:

Homeowner details	Full name:
	Installation address:
	Email:
	Mobile:
Homeowner Wi-Fi details	Wi-Fi Name:
	Wi-Fi Password:

2.2 Guide to AS5139 installation requirements for a secondary BE14000-HV

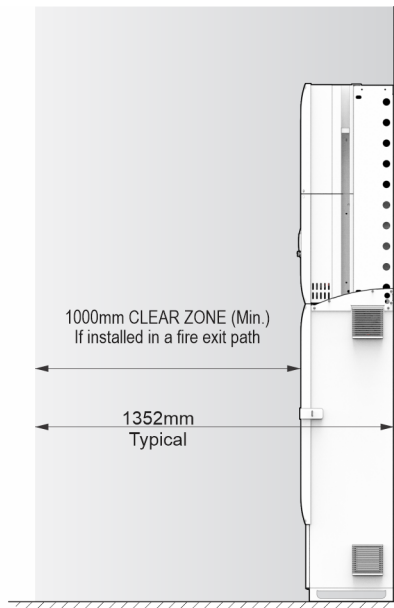
For AS5139:2019 compliance, the BE14000-HV is defined as a pre-assembled battery system. AS5139 prescribes allowable battery system locations and fire-proofing requirements. AS5139 is referenced in AS4777.1, AS3000 and the BCA, and all new or modified battery system installations must comply.

The installer is responsible for completing installation in accordance with all relevant standards and regulations, noting that existing installations, when modified, must also comply. The key AS5139 requirements for secondary BE14000-HV installation are:

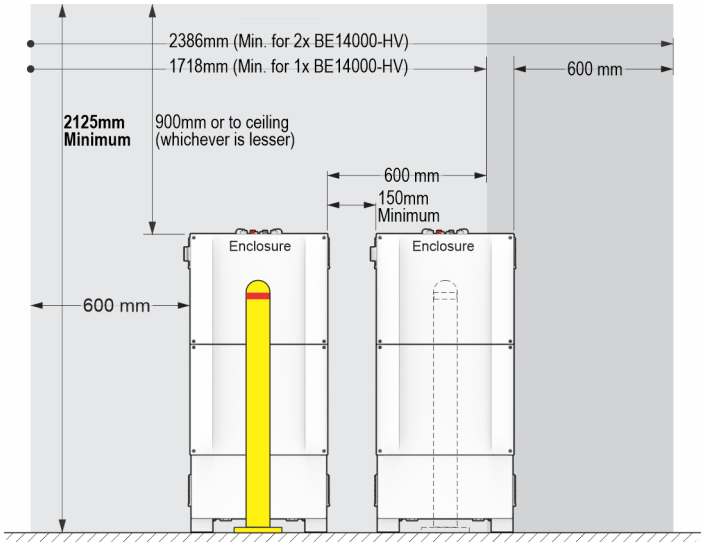
- Install the BE14000-HV against a wall in a clear zone having no windows, doors, exits, vents, or appliances other than the ST10000 inverter.
- Include in the zone any wall within 600mm of the sides and 900mm above the BE14000-HV.
- Fireproof any combustible wall in the zone if a habitable room exists on the opposite side of that wall. Fire-proofing materials must comply with AS1530.1.
- Fireproof any structure e.g., ceiling or eave less than 900mm above the BE14000-HV to the full width of the clear zone and the lesser of 950mm from the wall or to the edge of the structure.
- Use fire-retardant sealant to seal all penetrations through the wall that exceed 5mm internal diameter.
- Ensure 1m clearance in front of the BE14000-HV if it is located on a fire exit path.
- Protect the BE14000-HV from vehicle impact if this is a likely occurrence- use a bollard or similar device.

The most likely installation scenarios are illustrated below: any clear zone may need to be fireproofed.

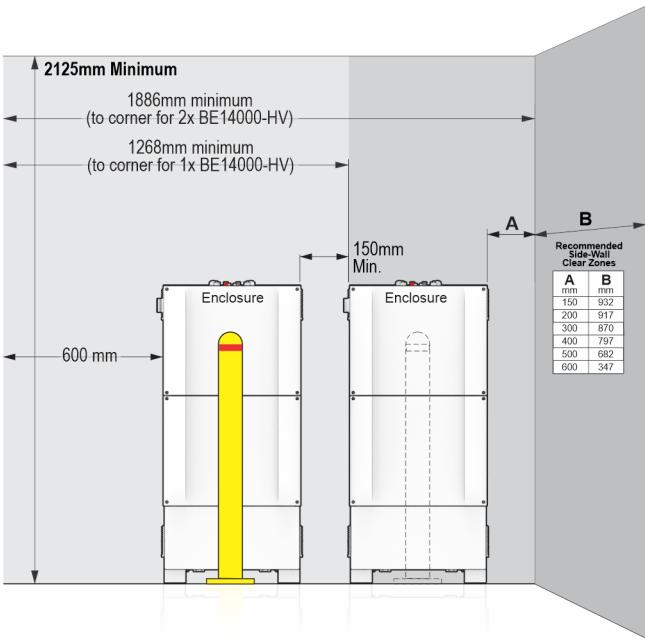
2.2.1 INSTALLATION ON AN EXIT PATH



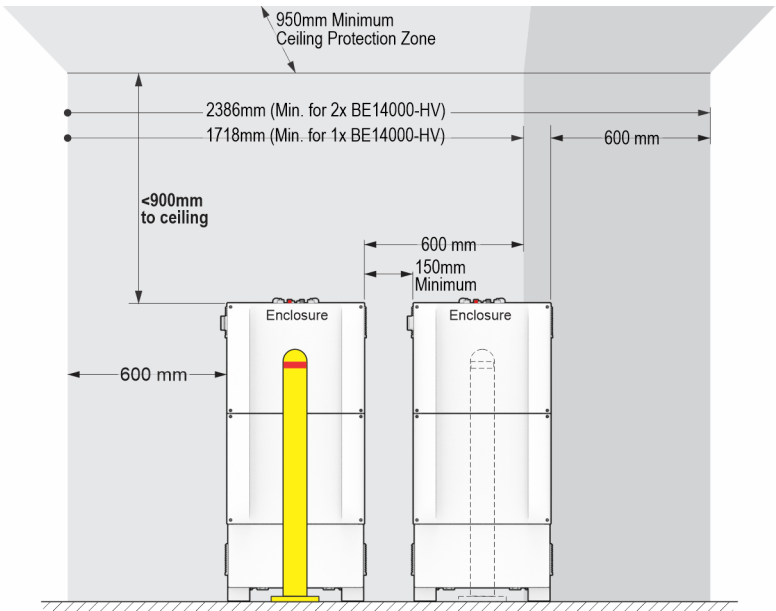
2.2.2 INSTALLATION ON A BLANK WALL



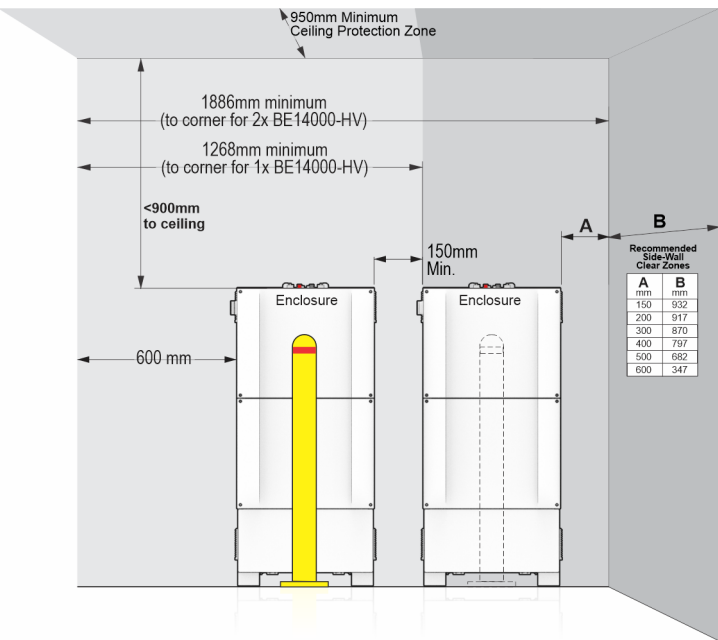
2.2.3 INSTALLATION NEAR A CORNER



2.2.4 INSTALLATION WITH A LOW CEILING

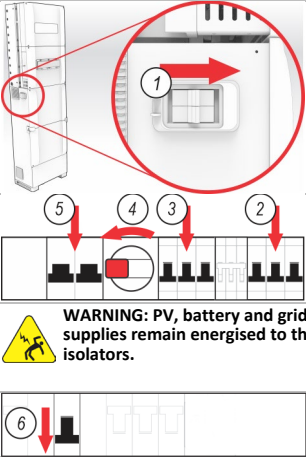


2.2.5 INSTALLATION NEAR A CORNER, WITH LOW CEILING



2.3 Shutdown the system

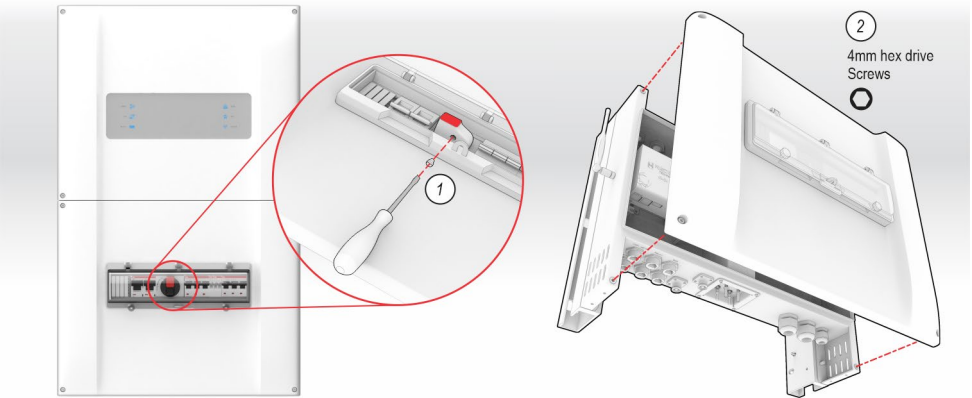
Shut down the inverter before beginning work.

STEP	PROCEDURE	COMMENT/ILLUSTRATION
1.	At the primary battery enclosure, switch the isolator OFF (right)	
2.	Open the BoS switchgear hatch. Switch the INVERTER AC isolator OFF (down).	
3.	Switch the BACKUP AC isolator OFF (down).	
4.	Turn the PV ARRAY DC isolator OFF (anti-clockwise).	
5.	Switch the BATTERY SYSTEM DC isolator OFF (down)	
6.	At the switchboard, turn the SOLAR SUPPLY MAIN SWITCH OFF. The system is now shutdown, noting that the PV Isolator remains energised.	

2.4 Prepare the BoS

The BoS Front Cover Panel must be removed to provide access to connections.

1. Open the Switch Panel Cover; remove the PV knob grub screw; remove the knob.
2. Remove the four retainer screws and carefully lift away the BoS Front Cover.



2.5 Installing the secondary BE14000-HV Battery Enclosure

2.5.1 INSTALLATION NOTES

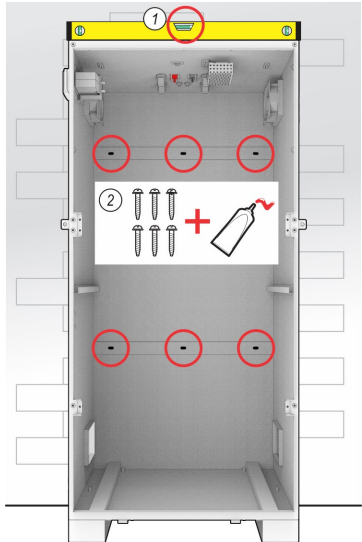
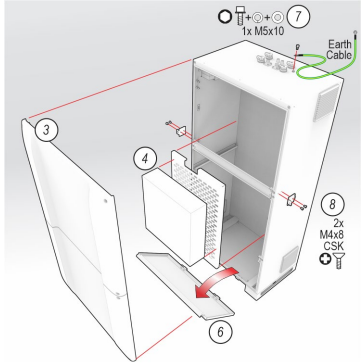
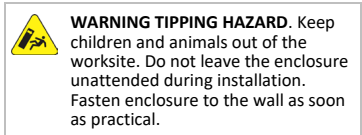
1. The BE14000-HV Battery Enclosure is designed for Redback ST10000 Smart Hybrid Inverters. It is not suitable for other inverters. The BE14000-HV Connection Kit includes parts to complete the installation of a second battery cabinet from 150mm up to 500mm from the primary cabinet. For cabinets more than 500mm apart, installers will need to fabricate all cables and supply a 60x60mm cable duct.
2. The enclosure features fan-assisted cooling. Ensure there is at least 150mm clear space either side of the enclosure. Do not block the cooling intakes or exhaust vents.
3. Stand the enclosure on a stable, level surface. Use packers under feet if needed.
4. Fasten the enclosure to a flat, structurally sound wall. Waterproofing will be affected if the enclosure is twisted or damaged. Use spacers if needed.
5. Installer to supply suitable wall fasteners, up to Ø7mm.

2.5.2 PRE-ASSEMBLY

1. Remove the cabinet from the transport carton. Place on a protective surface, front-side up.
2. Remove the upper and lower front covers and set aside. Take care not to damage the internal seal.
3. Remove the kick panel. The kick panel is hinged at the bottom edge – remove the screws at the top corners, tilt the panel forward and slide it off the hinge pins. Take care not to damage the internal seal.
4. Remove the Battery Shelf and Accessories Box. Locate the Packing List and verify all parts are supplied.
5. Attach the two padlock hoops using M4x8 countersunk screws.

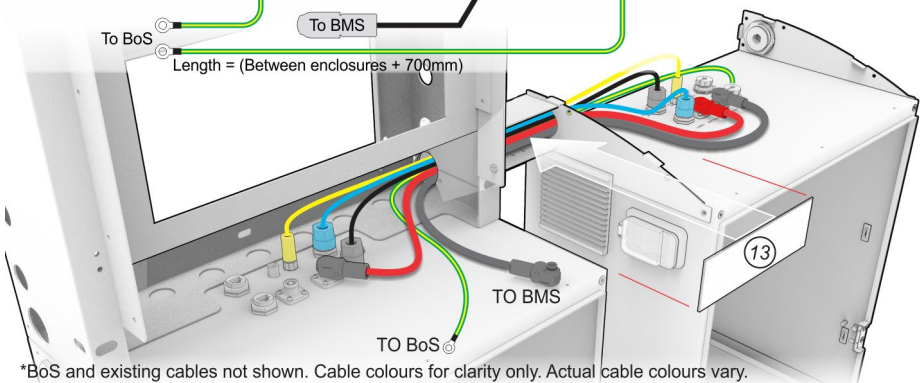
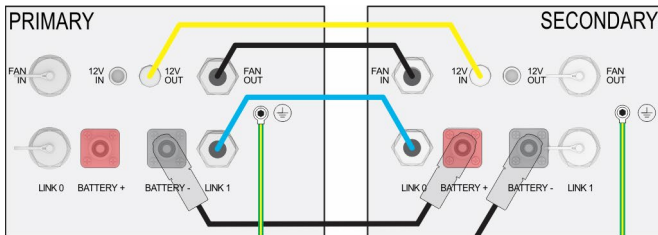
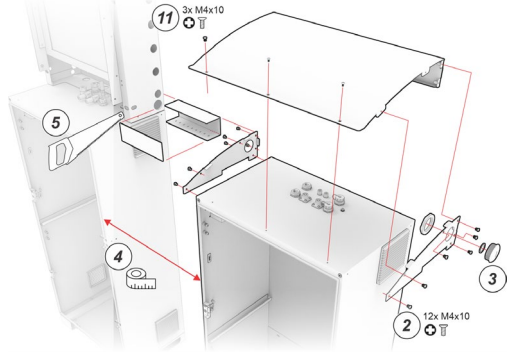
2.5.3 BATTERY ENCLOSURE INSTALLATION

1. Place the enclosure in the required location: on the floor; against the wall; 150mm minimum clear space both sides.
2. Set the enclosure level. Use a spirit level as required. Add packers under feet if necessary.
3. Check that the wall is flat. Use spacers as needed to ensure the enclosure does not distort when fastened to the wall.
4. Six mounting points are provided, as shown at right.
5. Fix the enclosure to the wall using suitable fasteners.
6. Seal around the fasteners using the supplied sealant.



2.5.4 CONNECTION KIT INSTALLATION

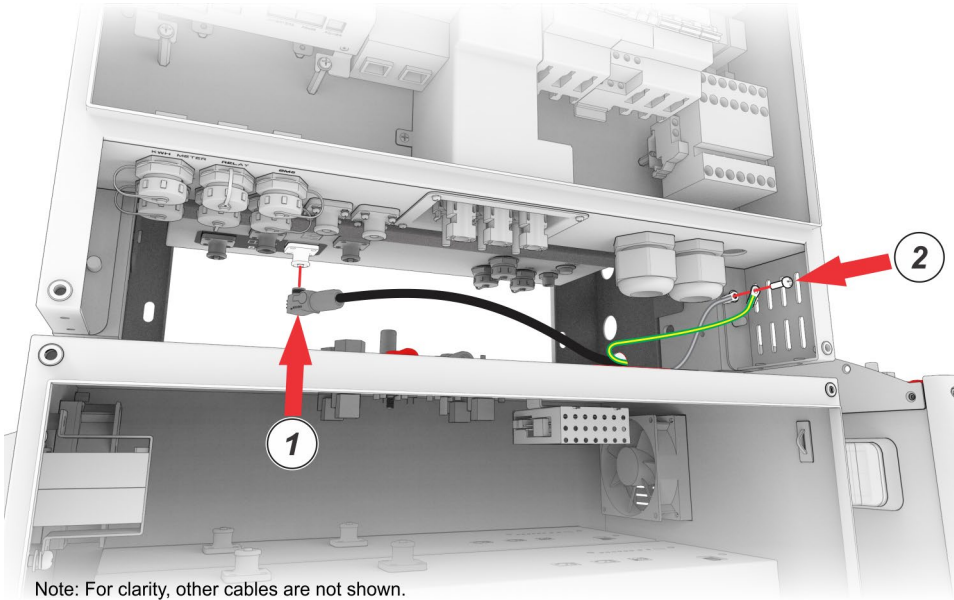
1. Open the Connection Kit and find the packing list. Verify all parts are supplied.
2. Fit the Connection Kit Side Covers using 2x M4x10 each side.
3. Fit the Blind Grommet as shown right.
4. Measure the distance between the Wall Mounting Frame and the nearest side cover.
5. Cut the Extension Kit Cable Duct to the required length (1-2mm less than measured distance).
6. Align the cable duct channel to the 40mm holes in the side cover and fasten to the wall.
7. Identify the Fan/Comms cable harness, battery power cables and earth cable. Thread all cables and the harness through the 40mm holes and cable duct as shown (one at a time).
8. Remove the existing (short) black cable from the primary enclosure (connects primary enclosure BATTERY-VE terminal to BAT – terminal on bottom of BMS module).
9. Plug in all connection kit cables as shown. Ensure all glands are tight and power plugs are fully inserted.
10. Attach the earth cable to the secondary enclosure earth point using the supplied screw.
11. Fasten the Connector Kit Cap at top and sides using the 7 screws supplied.
12. Snap on the Cable Duct Cover and seal the edges using the supplied sealant.



*BoS and existing cables not shown. Cable colours for clarity only. Actual cable colours vary.

2.5.5 CONNECT SECONDARY ENCLOSURE TO BOS/BMS

1. Connect the earth cable to the BoS stud as shown below.
2. Plug the power return cable into the BMS module as shown below. Note: the target is the rearmost black terminal.
3. Ensure all battery plugs are fully inserted.



Note: For clarity, other cables are not shown.

2.6 Battery installation



WARNING. SHOCK HAZARD. New batteries have charge. Turn the inverter BATTERY SYSTEM DC isolator OFF during installation.



INFORMATION FOR FUTURE USE. When replacing or adding batteries, all batteries must be charge balanced and firmware must be updated, otherwise system performance will be affected.

Installation notes

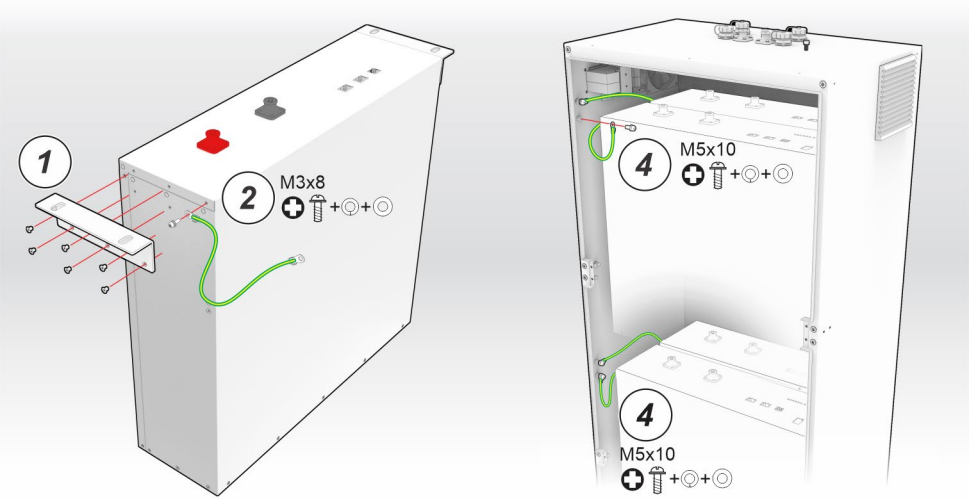
- 1. The Redback system has a storage capacity of up to 28.4kWh using 4 or 8 Pylontech batteries.
- 2. Use Pylontech H48050 or H48074 batteries but do not mix models. The nominal capacities are shown at right.
- 3. The battery naming and positioning convention is shown on the next page.
- 4. To ensure even and airflow cooling, batteries must be installed in the approximate positions shown. Batteries must not touch the rear or sides of the enclosure, or each other.
- 5. Batteries must be independently earthed to the cabinet as shown below.

QTY	NOMINAL CAPACITY (KWH)	
	H48050	H48074
4	9.6	14.20
8	19.2	28.40

2.6.1 PREPARING PYLONTECH BATTERIES

Each battery must be earthed to the enclosure cabinet.

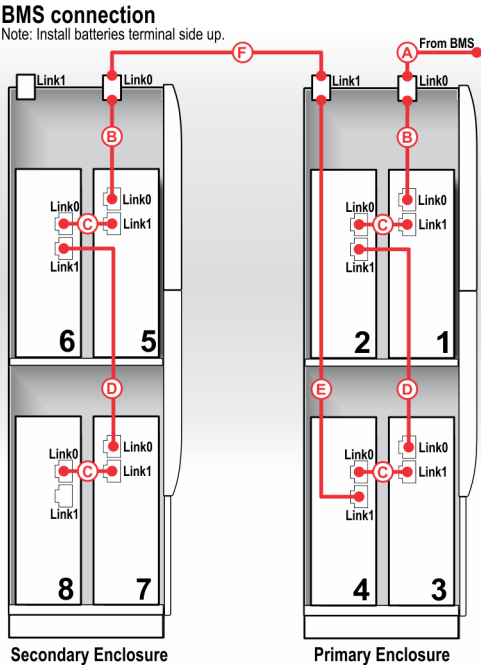
- 1. Remove the rack-mounting brackets.
- 2. Connect an earth cable to the front bracket mount point, as shown, using the M3.0x8 screw and washers.
- 3. Position batteries in the cabinet as shown below. Place the batteries with approximately equal air gap all round, to optimise cooling.
- 4. Connect the earth cable from each battery to a nearby earth post (M5x10).



2.6.2 BMS CABLE CONNECTIONS

BMS cables connect the BMS module to the first battery, and between subsequent batteries.

- 1. Open the primary enclosure and ensure that BMS cable “E” is correctly fitted.
- 2. Inside the secondary enclosure, connect supplied cables B, C and D as required.
- 3. Cable “F” is part of the harness fitted at section 2.5.4.
- 4. Store any unused cables in the enclosure.



CABLE LEGEND				
A	BMS to BE	500mm	1x	Included with ST10000
B	BMS IN	400mm	1x	Pre-fitted to BE14000-HV
C	BMS (BATT to BATT)	300mm	2x	Included with BE14000-HV
D	BMS (BATT to BATT)	900mm	1x	Included with BE14000-HV
E	BMS OUT	1000mm	1x	Included in Connection Kit
F	BMS BE to BE	1200mm	1x	Included in Connection Kit
1,2,3 etc	Battery number (in BMS sequence)			

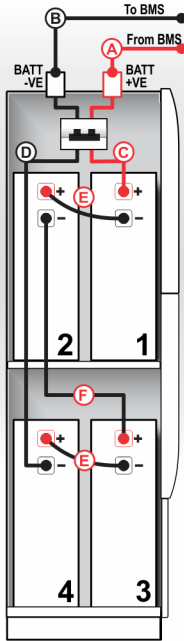
2.6.3 BATTERY POWER AND CONNECTIONS

Connect the battery power connections as shown below.

1. Batteries are connected in series: minimum of four batteries, or up to eight batteries, all the same model i.e., all H48050 or all H48074.
2. The battery leads C & D are coiled and zip-tied in place for transport. Use end cutters to release.
3. Route cables to the lower shelf via the portals at sides of the upper shelf. Do not pinch cables.
4. Store any unused cables in the enclosure.

Single Enclosure

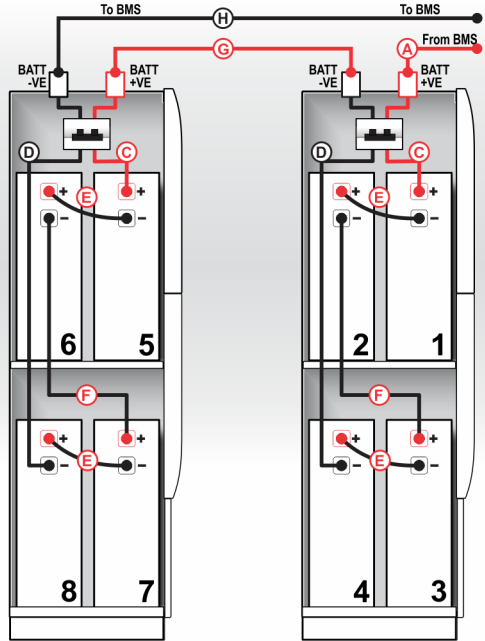
Note: Install batteries terminal side up.



Primary Enclosure

Dual Battery Enclosures

Note: Install batteries terminal side up.



Secondary Enclosure

Primary Enclosure

CABLE LEGEND

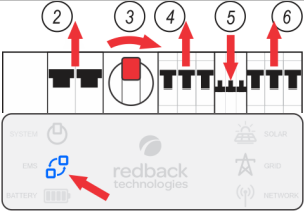
A	BMS to BE (Red)	500mm	1x	Included with ST10000
B	BMS to BE (Black)	500mm	1x	Included with ST10000
C	BATTERY 1 B+		1x	Pre-fitted to BE14000-HV
D	LAST BATTERY B-		1x	Pre-fitted to BE14000-HV
E	POWER1	900mm	2x	Supplied with BE14000-HV
F	POWER2	900mm	1x	Supplied with BE14000-HV
G	BE to BE	1200mm	1x	Included with Connection Kit
H	BMS to BE	1200mm	1x	Included with Connection Kit

3. Commissioning

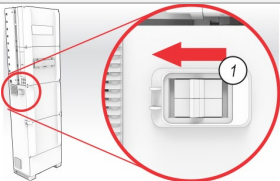
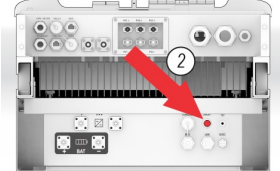
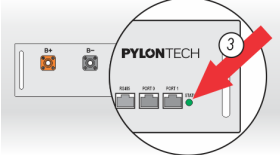
3.1 Restart the inverter

Start-up notes

- 1. Ethernet connected systems will automatically connect to the LAN and the internet. This is indicated after start-up: The EMS NETWORK LED and the Status Panel NETWORK icon are ON, and the EMS icon and EMS BLUETOOTH LED are flashing.
- 2. The flashing BLUETOOTH icon indicates the inverter is advertising.
- 3. Do not turn power OFF during start-up: start-up time will increase, and the EMS may crash.

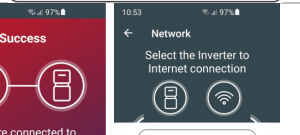
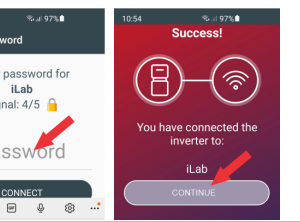
#	PROCEDURE	ILLUSTRATION
1.	Turn the SOLAR SUPPLY MAIN SWITCH ON	
2.	Turn BATTERY SYSTEM DC isolators ON (up)	
3.	Temporarily refit the PV ARRAY DC isolator knob and turn ON (clockwise to 12 o'clock).	
4.	Switch the BACKUP AC isolators ON (up)	
5.	Switch the BYPASS switch to Backup (down)	
6.	Switch the INVERTER AC isolators ON (up)	
7.	Wait 2 minutes for the Inverter to boot-up and advertise Bluetooth (EMS icon is flashing).	

3.2 Start the Pylontech batteries

#	PROCEDURE	ILLUSTRATION
1.	Switch the Primary and Secondary cabinets' Battery Isolators ON (to the left).	
2.	Behind the BoS, find the BMS module ON/OFF switch and press ONCE.	
3.	In the battery cabinets, observe the Status LED on each battery. Within 10 seconds they will stabilise to green.	
4.	The batteries are now initialised.	

3.3 Connect RedbackINSTALL to the inverter

The RedbackINSTALL app is very user friendly... it barely requires any guidance, and there is in-app information when you need it. This procedure is for adding the secondary enclosure to a previously commissioned system. For completely new installation refer to the ST10000 Installation Manual.

# PROCEDURE	ILLUSTRATION
1. Ensure the Inverter Status Panel EMS LED is flashing, indicating that Bluetooth is available. If not flashing, press the spider to restart the system.	
2. Login to RedbackINSTALL. SCAN and select from the Inverter list. Note: the app will automatically connect if only one inverter is detected.	
3. Select the type of connection the Inverter will use to connect to the internet: Wi-Fi, LAN, or None.	
4. The app will guide you through validating the new configuration. Just follow the prompts.	

3.4 Confirm configuration success

Go to portal.redbacktech.com and search for the inverter (by serial number or address). Search for matching battery info.

4. Maintenance



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

The Redback BE14000-HV is a low maintenance product. Annual maintenance is required.

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

ITEM	NAME	REASON	PROCEDURE	BY SERVICE PERSON	BY OWNER
1.	Battery Enclosure vents and filter	Airflow is reduced when dust accumulates on the vents, or the filter is clogged. The lower intake vents are more likely to be affected.	Use a small pry tool to release the vent covers - gently pry next to the notches at top or bottom of cover. Blow or brush the vents clean. Wash the filter pads in soapy water and squeeze dry. Refit all parts ensuring the vents face downward.	✓	✓
2.	Battery Enclosure Fan blades	Fan efficiency is reduced when dust accumulates on the fan blades.	Remove the Upper Vent Cover and filter pad. Gently blow, brush, or wipe off fan blades. Do not overspeed the fan. Replace all parts.	✓	✓
3.	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.	✓	✓
5.	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.	✓	✗
6.	Cabinet seals	Concealed seals ensure cabinet water resistance	Remove front covers and inspect seals for hardening, tears, or other damage. Look for signs of water in cabinets.	✓	✗
7.	Cable seals and caps	Seals and caps prevent water and insects entering the battery enclosure or connections.	Remove BoS front cover and Connection Kit top cover. Tighten all cable glands and waterproof caps.	✓	✗

5. System Specifications

PV Port	Version 0312	Version 0314	
Number of MPPTs	2	2	
Strings per MPPT Input	2/1	2/1	
MPPT Operating Voltage (range)	DC 200 – 550V	DC 200 – 850V	
Maximum Input Voltage (Vmax)	DC 600V	DC 1000V	
Maximum Current (Imp)	DC 12.5/22A	DC 12.5/22A	
Maximum PV Input Power ¹	16000Wp	16000Wp	
Short Circuit Current (Isc) ²	DC 17.5/36A	DC 17.5/36A	
Maximum Feedback Current	0A	0A	
Decisive Voltage Class (DVC)	DVC-C	DVC-C	
¹ Over-panelling benefits vary by location ² Manufacturer's declared and tested Max Short Circuit Current (Isc)			
Grid Interactive Port		All MODELS	
Nominal Output Voltage	AC 400/380V	Rated Input Apparent Power	15000VA
Nominal Output Frequency	50 Hz	Output Voltage THD	<3%
Rated Output Current	AC 14.5A / phase	Inrush Current	45A, 2 μs
Max. Output Current	AC 16.5A / phase	Maximum Output Fault Current	45A, 2 μs
Rated Output Active Power	AC 10000W	Decisive Voltage Class (DVC)	DVC-C
Rated Output Apparent Power	10000VA	Power Factor (range)	0.8 lagging to 0.8 leading
Rated Input Current	AC 22.7 A/phase		
Backup Port			
Nominal Output Voltage	AC 400/380V	Output Voltage THD	<3%
Nominal Output Frequency	50 Hz	Inrush Current	45A, 2 μs
Rated Current	AC 16.5A / phase	Maximum Output Fault Current	45A, 2 μs
Rated Active Power	AC 10000W ²	Maximum Output Overcurrent Protection	45A, 2 μs
Rated Apparent Power	10000VA		
Peak Apparent Power	16500VA (60 sec max)	Power Factor (range)	0.8 lagging to 0.8 leading
Decisive Voltage Class (DVC)	DVC-C		
² For 4x Batteries Rated Apparent Power = 5000W; for 8x Batteries Rated Apparent Power = 10000W.			
Battery Port			
Voltage (nominal)	DC 180 - 600V	Battery Type	Li-ion
Max. Current (charge)	DC 25 A	Battery Depth of Discharge	90%
Max. Power (charge)	DC 10000W	Short Circuit Current	400A
Max. Current (discharge)	DC 25 A	Decisive Voltage Class (DVC)	DVC-C
Max. Power (discharge)	DC 10000W		
General Information			
Operating Temperature Unconditioned without solar effects	-35°C to 60°C	AC Overvoltage Category	OVC III
		DC Overvoltage Category	OVC II
		Active Anti-islanding Method	Active Frequency Drift
Operating Temperature Derated Output	below 10°C and over 45°C	Moisture Location Category	4K4H
		Inverter Topology	Non-isolated
External Environment Pollution Degree	Grade 1, 2 and 3	Demand Response Modes	DRM 0
		Standby Self-Consumption	<15W
Operating Relative Humidity	0 - 95%	Noise Emissions (Inverter only)	<30 dBm
Operating Altitude	0 - 4000m	Country of Origin	China
Protective Class	I	Warranty	10 years
Ingress Protection Rating	IP66		
Efficiency			
Maximum Efficiency	97.60%	European Efficiency	96.80%
Maximum Battery to Load Efficiency	97.50%		

Physical Data					
Installed weight	Including 4 batteries		172-302kg		
	Including 8 batteries		210-378kg		
Dimensions (W x D x H mm)	ST10000 + 1x BE14000-HV		566 x 360 x 1960		
	ST10000 + 2x BE14000-HV		1175(min) x 360 x 1960		
Material	Aluminium cabinet and front covers; Stainless steel fittings				
Finish	Powdercoat and internal sealant				
Battery Enclosure Data					
Enclosure Model	BE14000-HV	Protective Class	I		
Name	Smart Hybrid Battery Enclosure	Ingress Protection Rating	IP54		
		Noise emissions	<42dBA◆		
Number of Battery Units (N)	4 or 8	Maximum Capacity	28.4kWh		
Storage Capacity	N x 2.4kWh	Nominal Voltage	DC N X 48V		
	N x 3.55kWh	Rated Current	DC 25A		
Battery System Model	RB-HVS-Nx48-50	Fan Specification	DC 12V / 0.3A x2		
	RB-HVS-Nx48-74	Dimensions (W x D x H mm)	545 x 348 x 1125		
Material	Steel cabinet; Aluminium front covers; Stainless steel fittings				
Finish	Powdercoat and internal sealants				
Isolators	PV Port	Grid Interactive Port	Backup Port	Battery Port	Battery Cabinet
Manufacturer Part Number	XBE+3610	S203-C40	S203-C25	S802PV-SP32	NoArk Ex9BP
Rated Insulation Voltage	1100V	440V	440V	DC1500V	DC1000V
Rated Impulse Withstand Voltage	8kV	4kV	4kV	8kV	4kV
Suitability for Isolation	C	C	C	C	C
Rated Operational Current	16A	40A	25A	32A	32A
Utilisation Category	DC-PV2	A	A	A	A
Rated Short-time Withstand Current (Icw)	700A	-	-	-	-
Rated Short-circuit Making Capacity (Icm)	1000A	-	-	-	-
Rated Breaking Capacity (Isc)	5kA	15kA	15kA	5kA	10kA
Communications Ports and Protocols					
Ethernet	RJ45; Straight-thru	RS485	RJ45; Factory Use Only		
DRED	RJ45; DRED	Wi-Fi	802.11b/g/n/ac; 2.4GHz		
Relays	RJ45; 3x Digital I/O; +DC5V & GND	LTE	na		
kWh Meter	RJ45; RS485 MODBUS	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; MyRedback app				
Remote Firmware Updates	Supported				
Power/Energy Monitoring	Includes 1 x utility grade energy meter (class 1)				
Certifications and Approvals					
AS/NZS 4777.2:2020	IEC 62116:2014	IEC 60529	RCM		
IEC 62109-1:2010	IEC 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 5033:2021			
◆Measured in Redback laboratory at 1m in front of Battery Enclosure.					

Notes

Notes

7. Close-up and handover

7.1 Close-up

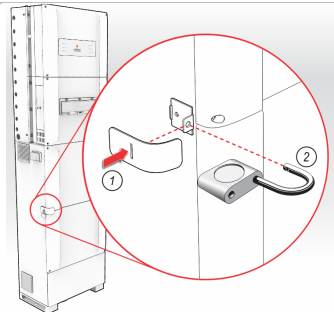
After the system settings are updated and the system has returned online:

Item	Procedure	Completed
1	Replace all covers.	
2	Replace and secure PV ARRAY DC isolator knob.	
3	Clean worksite and dispose of rubbish appropriately.	

7.2 Handover

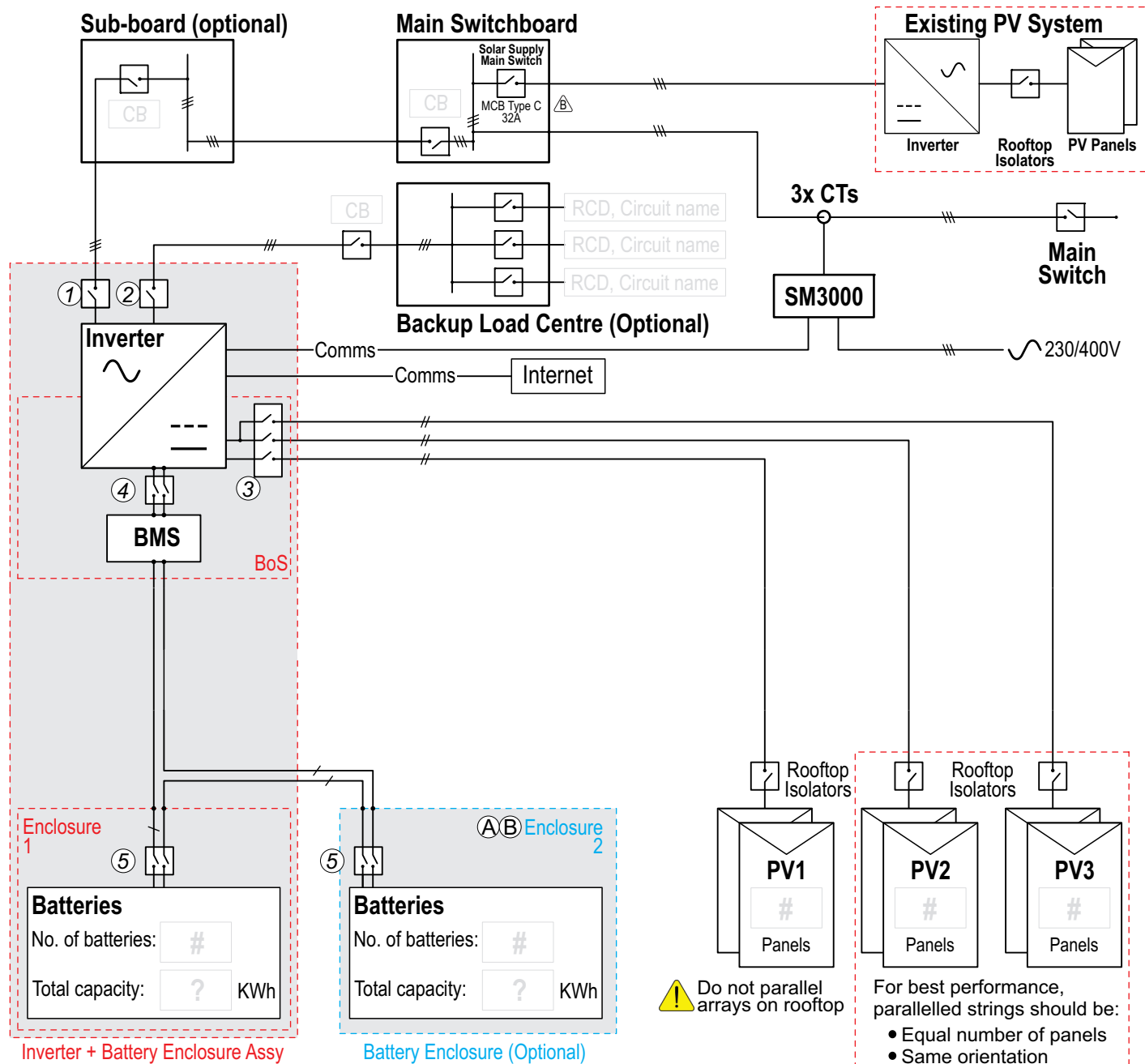
With the homeowner:

Item	Description	Completed
1	Walk through the installation, ensuring the homeowner understands what has been installed (and where), including any Backup circuits.	
2	If possible, update the system information in the ST1000 Homeowner's Guide, originally supplied with the new system.	
3	Have the owner fit the Security Clamps and padlocks (Optional; 2x padlocks per enclosure required). Ensure the owner has the keys.	
4	Explain the limitations of the system, including the possibility of overloading the backup circuit by using too many devices simultaneously, even when the grid is connected.	
5	Demonstrate how to recover after a BACKUP circuit overload.	
6	Demonstrate how and when to use the BYPASS switch.	
7	Assist owner to complete their Redback Account setup, if not already done.	
8	Assist owner to download the app, demonstrate features and answer questions.	
9	Assist owner to log on to portal and demonstrate, including how to: • Review performance • Setup battery charge/discharge schedules • Setup relay schedules • Raise an on-line support request.	
10	Handover to the homeowner, including: • Homeowner's Guide • Warranty Booklet • Padlock keys (if fitted) • Installation Manual (optional)	



ST10000 SINGLE LINE DIAGRAM - AC-COUPLED INSTALLATION

Installer: Complete and retain for your site documentation



Do not parallel arrays on rooftop

For best performance, paralleled strings should be:

- Equal number of panels
- Same orientation
- Same tilt

ST10000/BE14000-HV Integrated Isolators

- ① Inverter AC Isolator 40A
- ② Backup AC Isolator 25A
- ③ PV Array DC Isolator 6P 12.5A @800V
- ④ Battery System DC Isolator 32A
- ⑤ Battery Enclosure DC Isolator 32A

Notes:

- 2nd enclosure requires optional Connection Kit
- This product is not warranted for off-grid installation which is defined to be an installation at a premises that is intentionally unable to receive energy from a low voltage distribution Network.

Other devices

Record details of installer selected devices (in grey boxes provided).

B	Solar Supply Main Switch specification added	AS	AK	01Mar2023
A	Formatted to centrefold layout.	AS	AK	06JUL2021
ITEM CHANGE DETAILS		DRAWN BY	APPROVED	DATE
DESCRIPTION				
ST10000 3-PHASE INVERTER SINGLE LINE DRAWING AC-COUPLED INSTALLATION				
DRAWING NUMBER File: ST10000 Single Line Diagram r4.des				
DRAWING NUMBER 340-00601-00		REVISION 4	SHEET 1 OF 2	A4

SCALE	NA	MATERIAL
DRAWN	AS	DATE 01MAR2023
CHKD	AK	DATE 01MAR2023
APPD	PL	DATE 01MAR2023

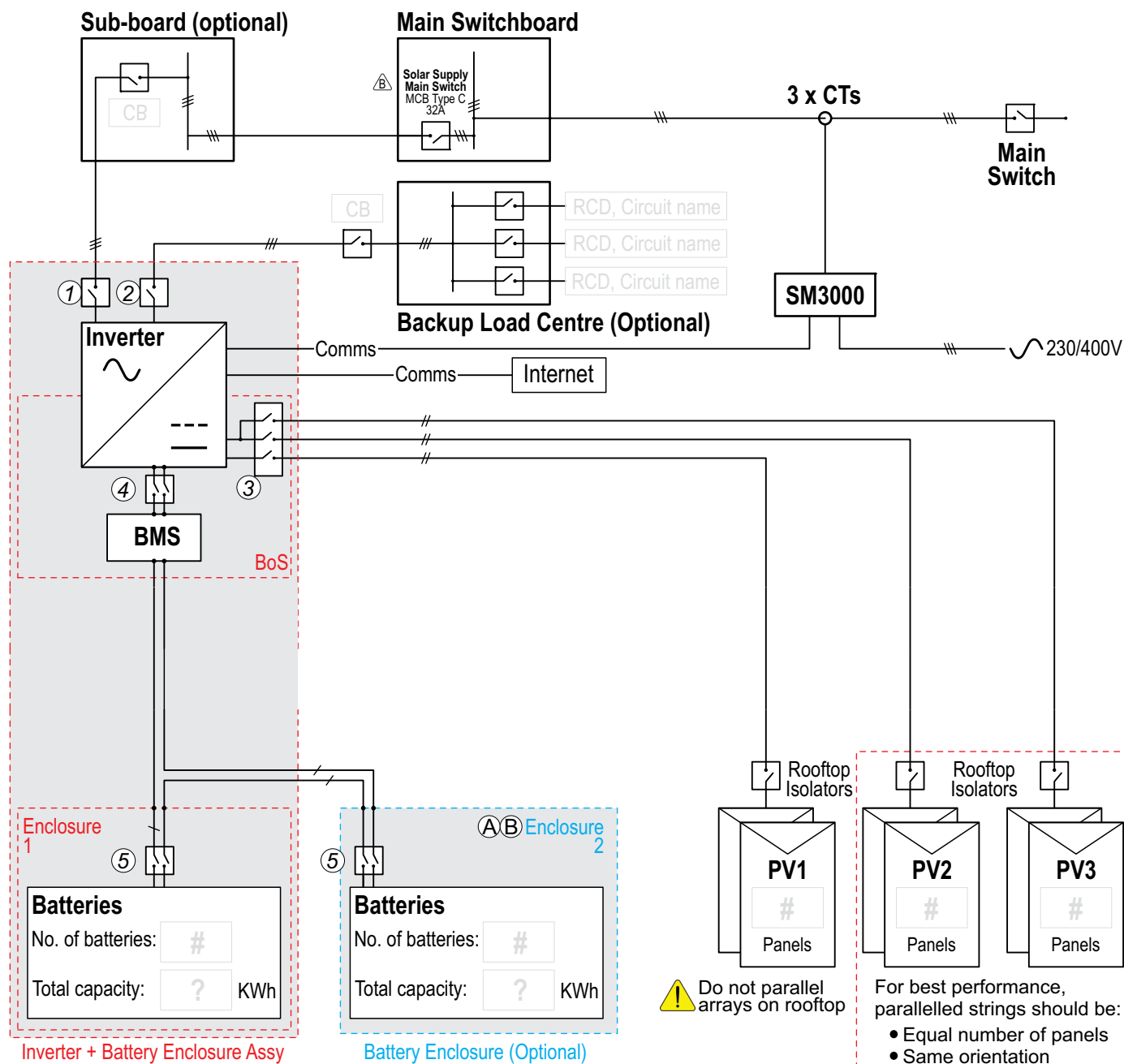
FINISH	
--------	--



Building 1015, 80 Meiers Rd,
Indooroopilly, QLD 4068 Australia
1300 240 182 www.redbacktech.com

ST10000 SINGLE LINE DIAGRAM - INDEPENDENT INSTALLATION

Installer: Complete and retain for your site documentation



ST10000/BE14000-HV Integrated Isolators

- ① Inverter AC Isolator 40A
- ② Backup AC Isolator 25A
- ③ PV Array DC Isolator 6P 12.5A @800V
- ④ Battery System DC Isolator 32A
- ⑤ Battery Enclosure DC Isolator 32A

Notes:

- 2nd enclosure requires optional Connection Kit
- This product is not warrantied for off-grid installation which is defined to be an installation at a premises that is intentionally unable to receive energy from a low voltage distribution Network.

Other devices

Record details of installer selected devices (in grey boxes provided).

SCALE		MATERIAL		DESCRIPTION		DRAWN BY		APPROVED		DATE	
NA				ST10000 3-PHASE INVERTER SINGLE LINE DRAWING INDEPENDENT INSTALLATION		AS		AK		01Mar2023	
DRAWN		DATE		PART NUMBER		REVISION		SHEET		A4	
AS		01MAR2023		340-00601-00		4		2 OF 2			
CHKD		DATE		FINISH							
AK		01MAR2023									
APPD		DATE									
PL		01MAR2023									

