

## Installation Manual

# Rechargeable Li-ion Battery

RED-R2-16KLV

v1.1 6/7/2026



## HISTORY

| VERSION | ISSUED  | COMMENTS                                                                   |
|---------|---------|----------------------------------------------------------------------------|
| 1.0     | 11Dec25 | First version                                                              |
| 1.1     | 6Jul26  | 1. Supplement installation content and precautions<br>2. Parameter updates |

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## START HERE....

This manual describes the installation and commissioning of one or more Redback RED-R2-16KLV Residential Lithium-ion batteries, hereafter called the “16KLV” or the “battery” or the “batteries” or collectively, the “battery stack”.

The battery is supplied as a single, ready-to-install assembly, suitable for new or replacement installations. This manual is generic in nature but may reference other Redback Technologies products.

This manual is for use by authorised installers only.

*Note: This manual does not include installation of battery racks or enclosures or cabinets, or associated hardware. Please refer to the manufacturer's documentation and applicable regulations.*

## 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 require assistance, book Redback Technical Support two days before going to site. This ensures that technical support is reserved for you if you are on-site and need assistance. The Redback Customer Support team is in Brisbane, Australia and is available 8am-4pm (Brisbane time) Monday to Friday. There are three ways to book support:

Web: [redback.link/support](https://redback.link/support)

SMS: +61 417 632 065

Call from Australia: 1300 240 182

Call from New Zealand: +61 7 3180 2325

## NEED SOMETHING ELSE?

- . This manual in electronic format

Download from [redback.link/r15kim](https://redback.link/r15kim)

- . Material Data Safety Sheet (MSDS)

Download the battery MSDS from [redback.link/r15kmsds](https://redback.link/r15kmsds)

- . Other document? Visit the Redback Document Library

Installer and Owner documentation is available for our current products. Go to [redback.link/docs](https://redback.link/docs)

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

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## 1. Introduction

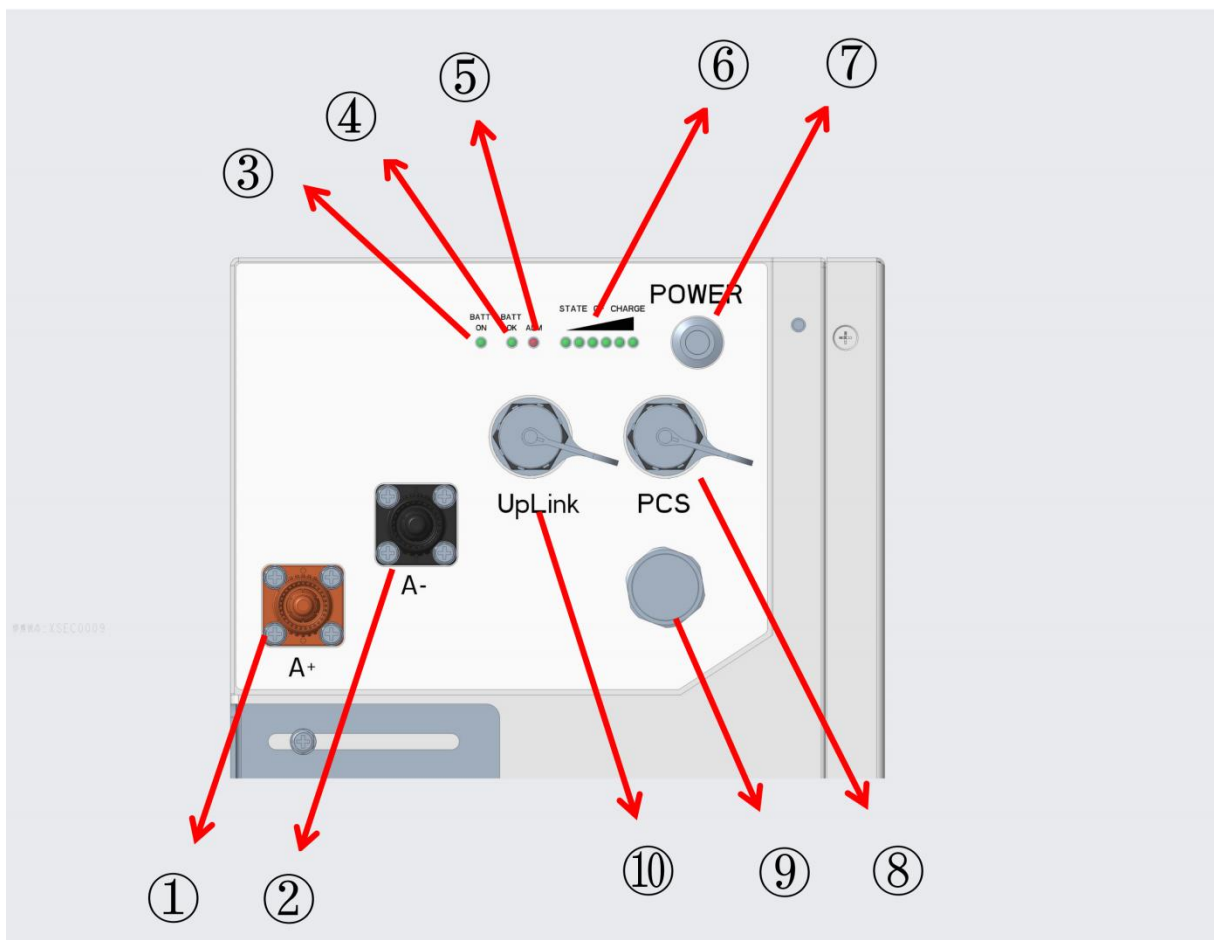
The RED-R2-16KLV battery module (hereafter called the 16KLV or the battery) is designed for use in residential energy storage or similar systems.

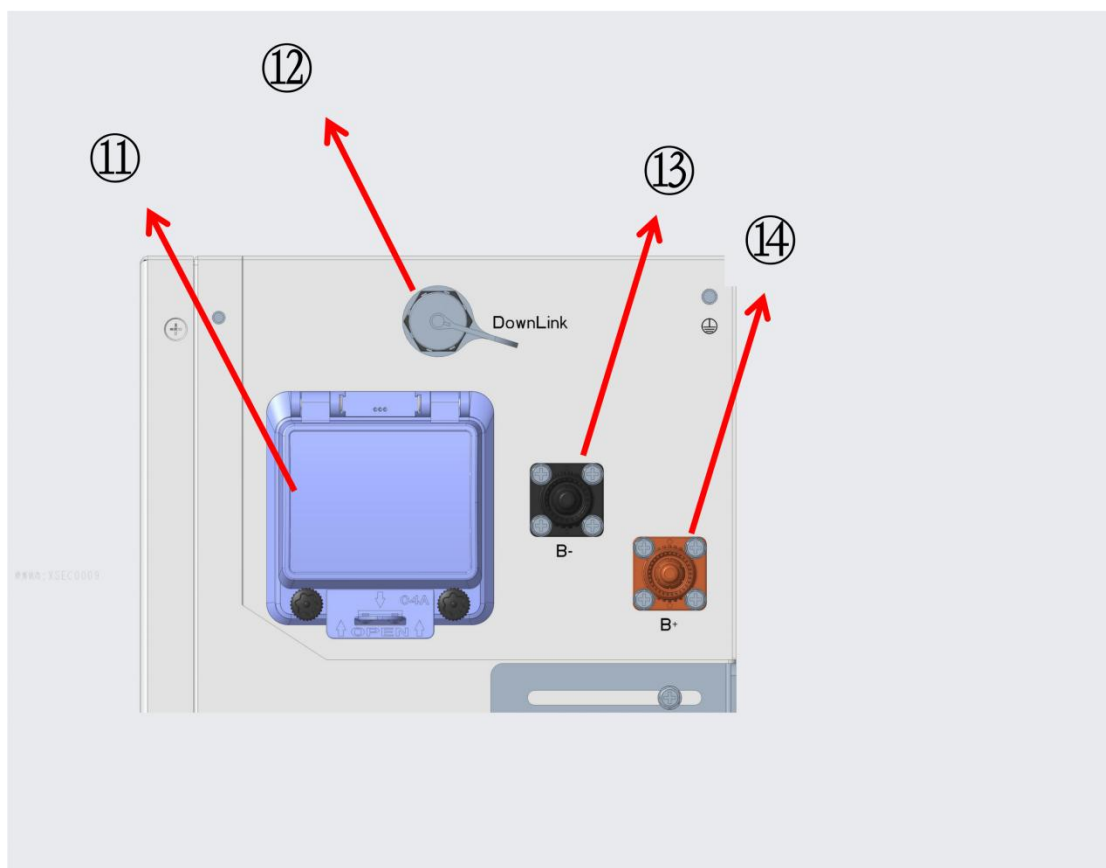
The battery uses Lithium-ion phosphate (LiFePO<sub>4</sub>) chemistry.

*Note: Due to continuous product improvement the actual product may vary slightly from the illustrations in this document.*

## 2. Know your product

### 2.1. Physical features

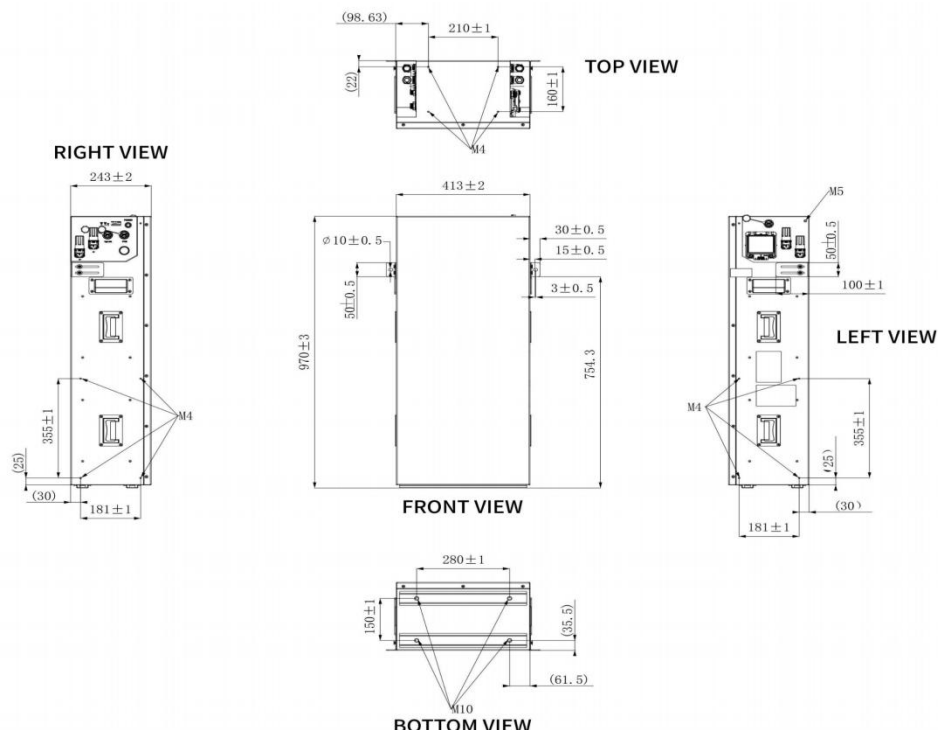




| # | PART NAME                      | #  | PART NAME               | # | PART NAME |
|---|--------------------------------|----|-------------------------|---|-----------|
| 1 | DC Positive sockets (A+)       | 8  | PCS port                |   |           |
| 2 | DC Negative sockets (A-)       | 9  | Explosion-proof valve   |   |           |
| 3 | Battery Power indicator LED    | 10 | Uplink (BMS in)         |   |           |
| 4 | Run LED                        | 11 | Switch                  |   |           |
| 5 | Alarm LED                      | 12 | Downlink (BMS out)      |   |           |
| 6 | Battery SoC indicator LEDs (6) | 13 | DC Negative sockets(B-) |   |           |
| 7 | Power button                   | 14 | DC Positive sockets(B+) |   |           |

## 2.2. Dimensions and weights

| ITEM         | CAPACITY (NOMINAL) | WIDTH   | HEIGHT  | DEPTH   | SHIPPING MASS | COMPONENT MASS |
|--------------|--------------------|---------|---------|---------|---------------|----------------|
| RED-R2-16KLV | 16kWh              | 413±2mm | 970±3mm | 243±2mm | 153kg         | 127kg          |



## 2.3. Battery features

### SYSTEM

- Install up to 15 batteries in parallel for 240kWh
- Automatic address setting in multi-stack installations
- IP65 rated metal case
- Fan-less design
- Low noise emission
- LED status indicators
- High level of integration
- Low power consumption

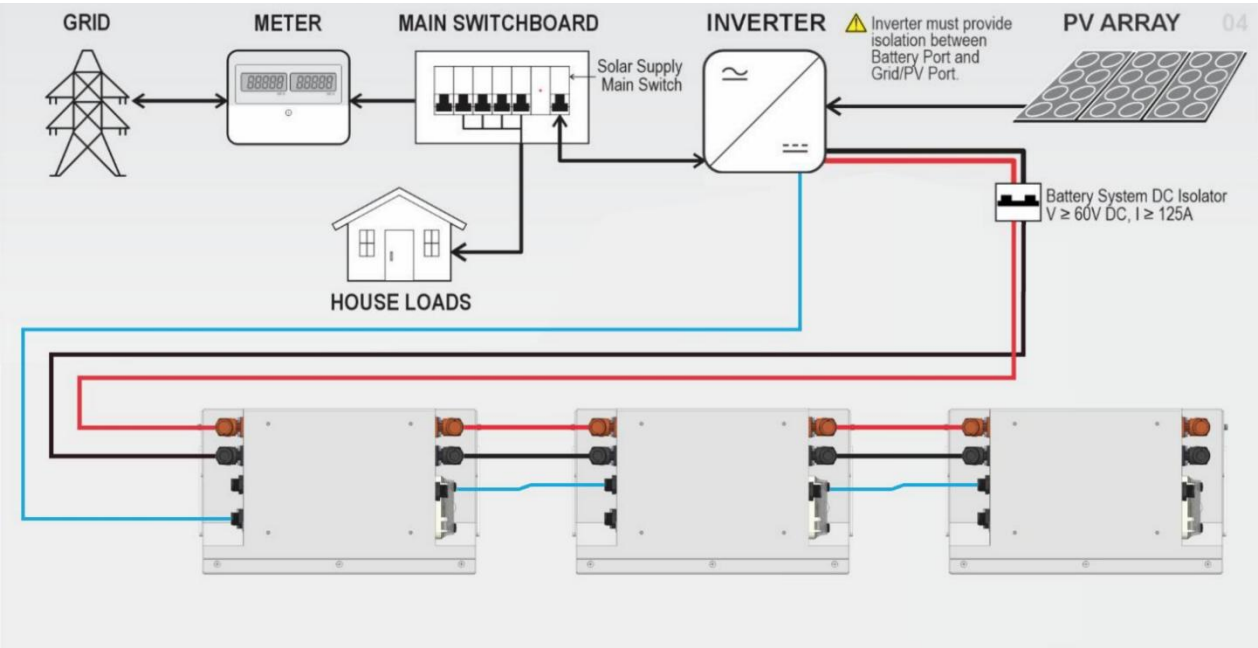
### BATTERY CHEMISTRY FEATURES

- LiFePO4 cathode for safety and durability
- Non-emissive battery chemistry
- Up to 95% depth of discharge
- No memory effect
- Excellent shallow charge performance
- Excellent shallow discharge performance
- 6-month shelf life

### BMS FEATURES

- Dual-channel RS485 communication
- Integrated serial IC
- Multiple sleep and wake up methods
- SoC estimation
- SoH estimation
- High voltage accuracy
- High current accuracy
- Charge equalization
- Automatic cell voltage balancing
- Short-circuit protection
- Power supply circuit isolation
- Over-current protection
- Over/under temperature protection
- Buzzer alarm (default is off)

2.4. Typical Battery usage in a PV system.





## 3. Safety

### IMPORTANT SAFETY INSTRUCTIONS – PLEASE READ

This document contains important safety instructions. Please read all the instructions and cautionary markings on the product and on any accessories. Failure to follow these instructions may result in personal injury or electrocution or may cause equipment damage.

### MATERIAL DATA SAFETY SHEET (MSDS)

View and download the MSDS from [redback.link/r15kmsds](https://redback.link/r15kmsds). In case of conflicting information, the MSDS overrides this manual.

### AUDIENCE

Installation, maintenance, and connection of Batteries must be performed by qualified personnel, in compliance with local electrical standards, wiring rules and the requirements of local power authorities and/or companies. The Redback Battery 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 to property, inverter, or equipment.

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

- Have knowledge of the functional principles and operation of low voltage batteries, 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 year, have completed Redback approved training on the installation of Redback batteries.

### SYMBOLS USED IN THIS MANUAL

| SYMBOL                                                                              | DEFINITION                                                                                                                                                                                                                 | SYMBOL                                                                              | DEFINITION                                                     | SYMBOL                                                                                | DEFINITION                     |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------|
|  | LETHAL DANGER!<br>Risk of electrocution.                                                                                                                                                                                   |  | CAUTION!<br>Hazard to equipment.                               |  | HEAVY LIFT<br>Seek help.       |
|  | DANGER!<br>Risk of electrical shock.                                                                                                                                                                                       |  | This product has recyclable parts. Dispose of correctly.       |  | HEAVY! Bend knees to lift.     |
|  | CAUTION!<br>Fire hazard.                                                                                                                                                                                                   |  | Do not dispose as household waste.                             |  | HEAVY! Two-person lift needed. |
|  | WARNING!<br>No naked flames.                                                                                                                                                                                               |  | REFER TO DOCUMENTS.                                            |  | GROUNDING                      |
|  | OBSERVE POLARITY<br>Do not reverse the positive and negative connections.                                                                                                                                                  |  | HAZARDOUS AREA<br>Exclude children and animals from this area. |  | CAUTION!<br>Risk of explosion. |
|  | PPE. Use appropriate Personal Protective Equipment including boots, gloves and masks as required. Damaged batteries may leak electrolyte or produce flammable gas.                                                         |                                                                                     |                                                                |                                                                                       |                                |
|  | Information. 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. |                                                                                     |                                                                |                                                                                       |                                |

### 3.1. Safety Precautions



In case of fire, contact Emergency Services immediately.

In case of other battery damage, observe accidental release measures at 3.1.6. Contact Redback promptly if abnormal operation is observed

#### 3.1.1. INSTALLATION AND OPERATION

Batteries present a risk of dangerous or lethal electrical shock to animals or humans and damaging short-circuit currents to property. Always practise safe work procedures and observe precautions listed below.

- Install the battery in accordance with the manufacturer's instructions.
- Protect the battery and associated cables from weather events, temperature extremes, UV exposure, humidity, impact, and vermin.
- Observe the required operational conditions listed in the specifications.
- Do not connect PV directly to the battery.
- Disconnect all sources of power prior to connecting or disconnecting DC plugs.
- Power-off and disconnect all DC cables prior to moving or beginning maintenance.
- Do not insert any object into the battery or electrical sockets, except the matching plugs.
- Do not paint or modify any part of the battery or associated cables.

#### 3.1.2. PERSONAL PROTECTIVE EQUIPMENT

| PARAMETER                | DURING NORMAL INSTALLATION, USAGE AND HANDLING                                                                | ADDITIONAL PRECAUTIONS DURING A HAZARDOUS EVENT                                                                                                 |
|--------------------------|---------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Eye and Face Protection  | Required if using power tools                                                                                 | Use tight sealing safety goggles and or face protection shield.                                                                                 |
| Hearing protection       | Required if using power tools                                                                                 |                                                                                                                                                 |
| Skin and Body Protection | Wear boots and normal work clothes.                                                                           | Wear insulated, protective gloves; clothing; leakproof footwear. Minimise contact with spills and clean or dispose contaminated items quickly.  |
| Respiratory Protection   | Mask if generating dust.                                                                                      | Watch for smells of medical ether. If exposure limits are exceeded or irritation is experienced, urgent ventilation and evacuation is required. |
| Shock protection         | Remove or cover watches, rings, piercings or other metal objects such as belt buckles.<br>Use insulated tools |                                                                                                                                                 |

#### 3.1.3. HAZARDS IDENTIFICATION

| PARAMETER                    | NOTES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Primary Route(s) of Exposure | Eye, skin contact, ingestion.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Health Hazard                | The batteries are not hazardous when used according to the instructions of manufacturer under normal conditions.<br>Abnormally, hazards include rupture, fire, heat or leakage of internal components, which may cause personal injury or property damage.<br>Battery damage may occur due to over-charging; overheating; swelling; electrical fault or improper connection; fire; immersion; drops, impacts or penetration; crushing; or dismantling.<br>Damaged batteries are dangerous! Handle as outlined below. |

#### 3.1.4. FIRST AID MEASURES

| PARAMETER  | NOTES                                                                                                                                        |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| Eyes       | Flush eyes with running water for at least 20 minutes, occasionally lifting the upper and lower eyelids. Seek medical attention immediately. |
| Skin       | Remove contaminated clothes and wash contaminated area with soap and water or shower for 15 minutes. Seek medical attention immediately.     |
| Inhalation | Remove from exposure and move to fresh air immediately.                                                                                      |
| Ingestion  | Do not induce vomiting or give food or drink. Seek medical attention immediately.                                                            |

### 3.1.5. FIRE FIGHTING MEASURES

| PARAMETER                                           | NOTES                                                                                                                                      |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Characteristics of Hazard                           | Dusts at sufficient concentrations can form explosive mixtures with air. Combustion generates toxic fumes.                                 |
| Hazardous Combustion Products                       | Carbon dioxide.                                                                                                                            |
| Fire-extinguishing Methods and Extinguishing Media: | For small fires, use water spray, dry chemical, carbon dioxide or chemical foam.<br>Disconnect external power sources as soon as possible. |
| Attention in Fire-extinguishing                     | Wear self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.                  |

### 3.1.6. ACCIDENTAL RELEASE MEASURES

| PARAMETER                                                            | IN CASE OF RUPTURE                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Personal Precautions, protective equipment, and emergency procedures | Attention! Corrosive material.<br>Avoid contact with skin, eyes and clothing.<br>Ensure adequate ventilation.<br>Use personal protective equipment as required.<br>Evacuate personnel to safe areas.<br>Keep people and animals away from and upwind of spill/leak.                                                                                                                                                                                                               |
| Environmental Precautions                                            | Prevent product from contaminating soil and from entering sewers or waterways.                                                                                                                                                                                                                                                                                                                                                                                                    |
| Methods and materials for Containment                                | Stop the leak if safe to do so.<br>As soon as possible, isolate the battery from the system, and contact Redback for advice.<br>Contain the spilled liquid with dry sand or earth.<br>Clean up spills immediately.                                                                                                                                                                                                                                                                |
| Methods and materials for cleaning up                                | Absorb spilled material with an inert absorbent (dry sand or earth). Scoop contaminated absorbent into an acceptable waste container. Collect all contaminated absorbent and dispose of properly.<br>Scrub the area with detergent and water; collect all contaminated wash water for proper disposal.<br>Do not allow leakages or wash or drenching fluids to reach ground water, water course or sewage system.<br>Dispose of contaminated PPE properly and in a timely manner. |

### 3.1.7. HANDLING AND STORAGE

| PARAMETER         | AT ALL TIMES                                                                                                                                                                                                                                                   | IN CASE OF DAMAGE                                                                                                     |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Handling          | Do not disassemble, crush, burn, expose to high temperatures or otherwise damage the battery: it may explode or cause burns.<br>Do not short any terminals.<br>Do not lay tools or metal objects on top of batteries.<br>Observe polarity during installation. | See Accidental Release Measures, above.                                                                               |
| Storage           | Store in a cool, dry, well-ventilated area away from incompatible substances.<br>Store in a secured location.<br>Keep out of the reach of children and animals.                                                                                                | See Accidental Release Measures, above.                                                                               |
| Other Precautions | Handle in accordance with good industrial hygiene and safety practice.                                                                                                                                                                                         | Avoid contact with skin, eyes or clothing.<br>Use personal protection equipment.<br>Use insulated tools if necessary. |

### 3.1.8. EXPOSURE CONTROLS

| PARAMETER            | AT ALL TIMES                                                                                                                                                                                                                   |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Engineering Controls | Use adequate ventilation to keep airborne concentrations low. If used under conditions that generate particulates, the ACGIH TLV-TWA of 3mg/m <sup>3</sup> respirable fraction (10mg/m <sup>3</sup> total) should be observed. |

### 3.1.9. STABILITY AND REACTIVITY

| PARAMETER                          | AT ALL TIMES                                        |
|------------------------------------|-----------------------------------------------------|
| Chemical Stability                 | Stable under recommended storage conditions.        |
| Possibility of Hazardous Reactions | None under normal processing.                       |
| Conditions to Avoid                | Exposure to air or moisture over prolonged periods. |
| Incompatible materials             | Acids, Oxidizing agents, Bases.                     |
| Hazardous Decomposition Products   | Carbon oxides.                                      |

### 3.1.10. DISPOSAL

| AT ALL TIMES                                                                    |
|---------------------------------------------------------------------------------|
| Recycle or dispose of in accordance with government, state & local regulations. |
| Do not discard batteries to general waste streams.                              |
| Do not incinerate.                                                              |
| Do not physically damage the battery e.g., do not drop, crush or puncture.      |

## 4. Installation notes

### 4.1. Applications

#### 4.1.1. NEW INSTALLATIONS

The Redback RED-R2-16KLV battery is designed specifically for use with Redback inverters but may be used in other applications provided:

- A Redback approved inverter is used, and
- Batteries are placed in a protective environment, as described below, and
- Correct communications protocols are observed, and
- Batteries are connected as described below, and
- Any custom cables are professionally made to the required specifications.

### 4.2. Tools required

- Standard Hand and Power tools
- Normal Electrician's PPE
- DC voltage and current testing equipment (multi-meter)

### 4.3. Installation location

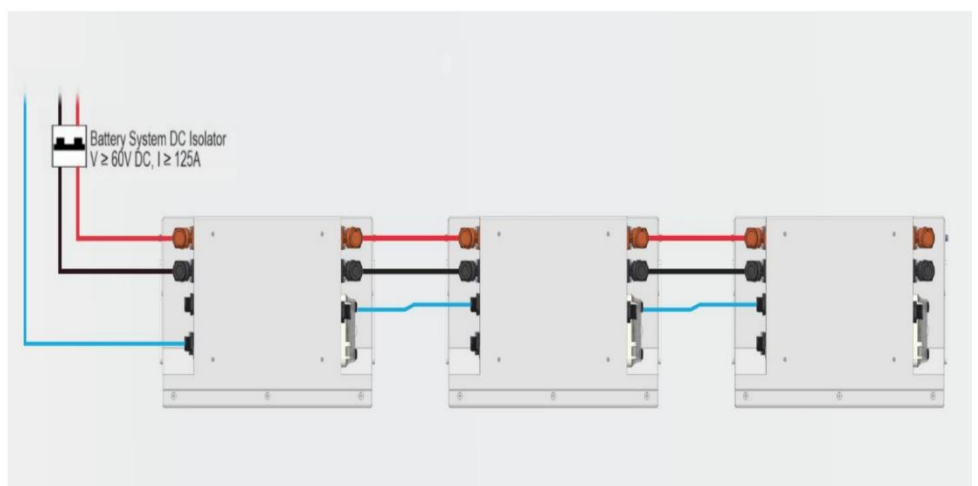
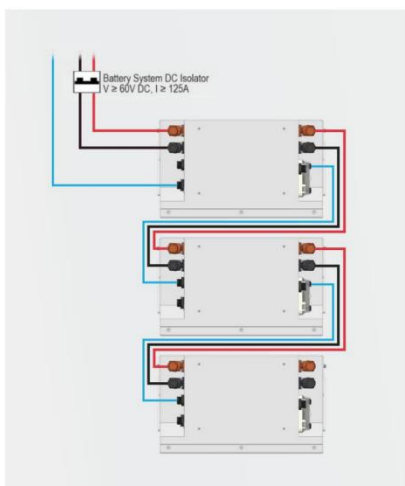
The batteries rely on radiant cooling, assisted by natural or forced air flow. In general, more space around the battery is better, and installation in confined spaces is not recommended unless that space is designed for that purpose e.g., a battery enclosure.

If the battery temperature rises or falls outside its operational range the battery will self-protect and cease operation. Repeated exposure to extreme conditions may derate input and output or reduce the life and performance of the battery.

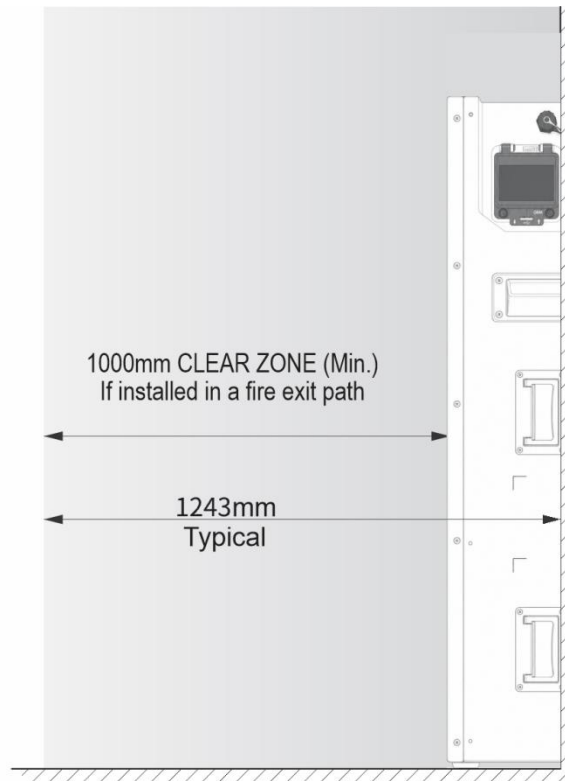
Ensure the battery installation location meets the following conditions:

- The battery can be installed indoors and outdoors, indoor installation can be done without considering ventilation conditions.
- The ambient temperature inside the enclosure is  $-20^{\circ}\text{C}$  to  $55^{\circ}\text{C}$ .
- The distance from any heat source is greater than 2m (e.g., from an air conditioner).
- There is adequate space around the enclosure (as specified by the enclosure manufacturer).
- There are no corrosive, flammable or explosive materials nearby.
- Installation complies to any other conditions mentioned in the Redback Product Warranty, Redback companion products' documentation, or the enclosure manufacturer's documentation.

Battery parallel connection method :

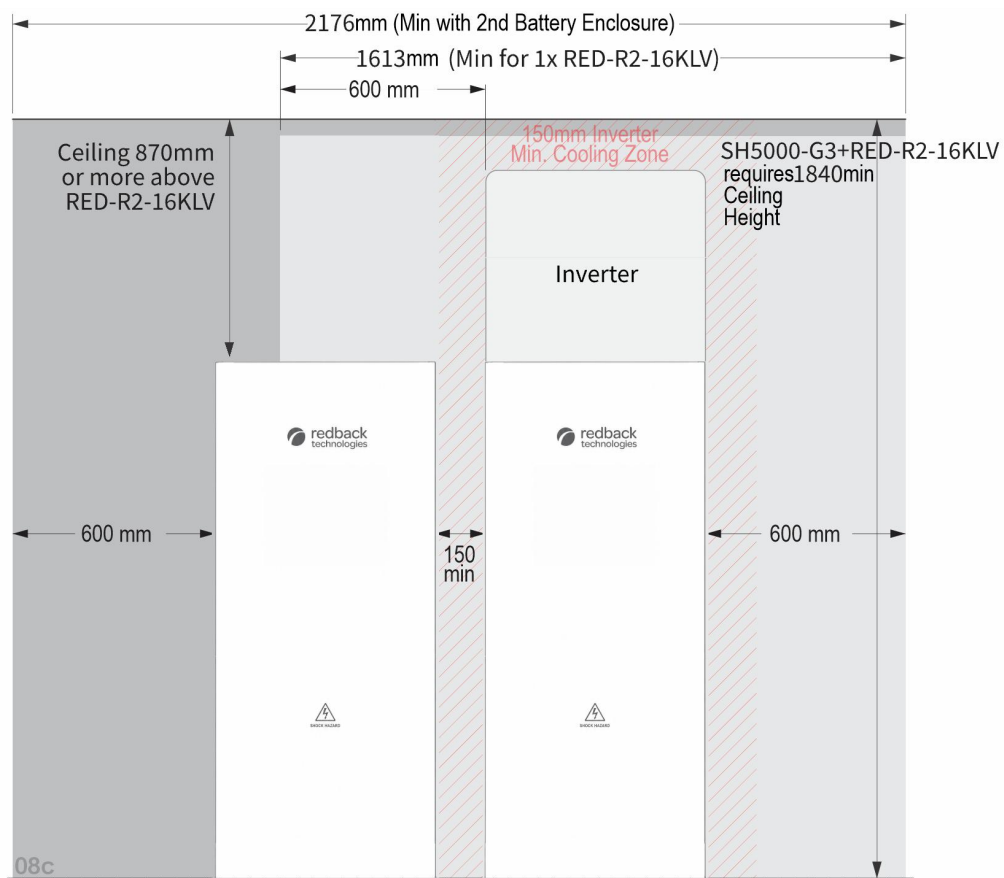


#### 4.3.1. INSTALLATION ON AN EXIT PATH



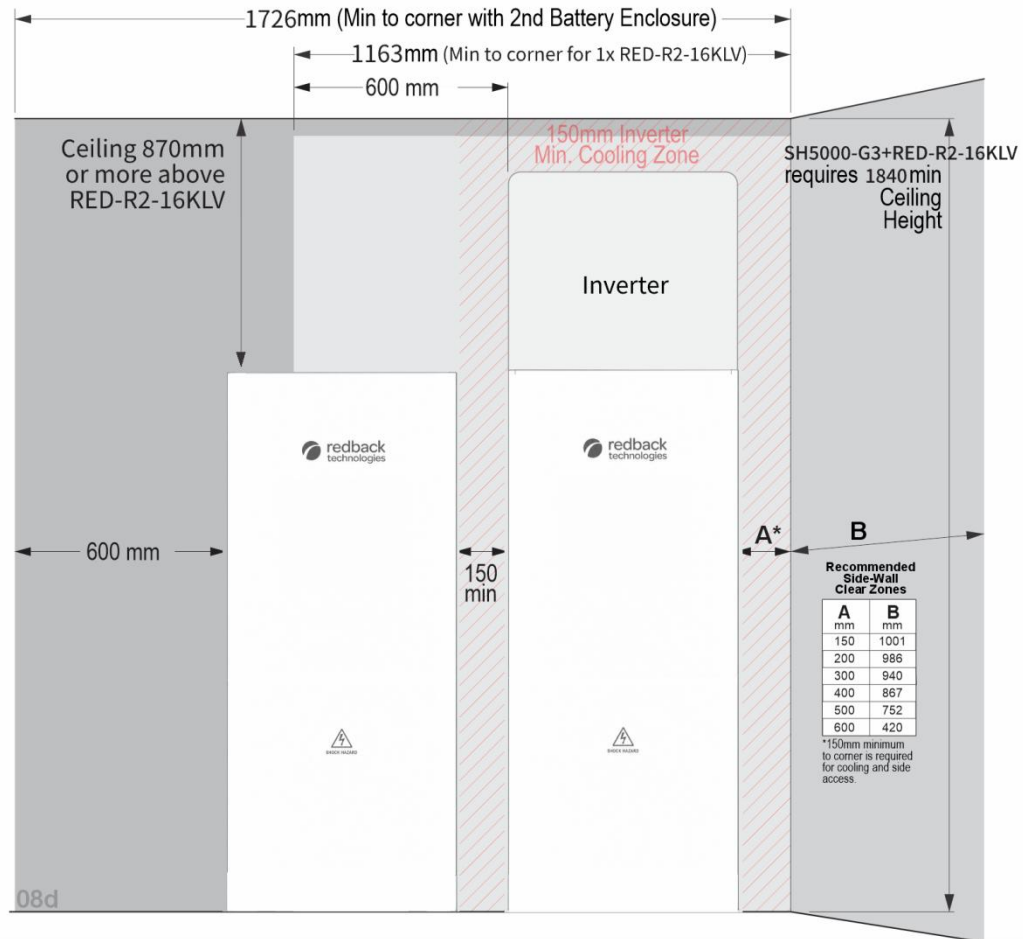
#### 4.3.2. INSTALLATION ON A BLANK WALL

Note: a ceiling height of less than 2.8m requires fire protection. See section 4.3.4.

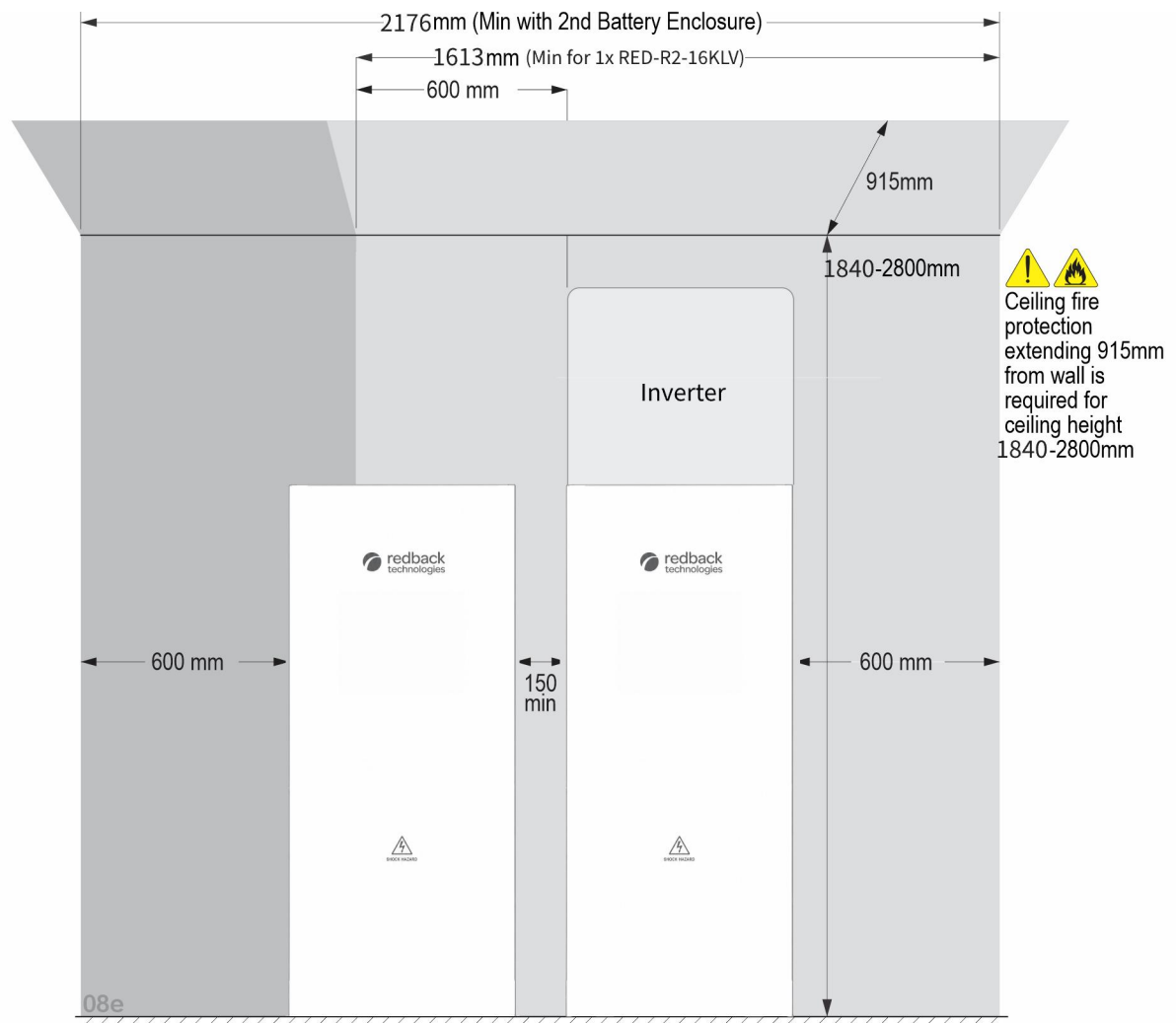


### 4.3.3. INSTALLATION NEAR A CORNER

Note: The installation of RED-R2-16KLV requires consideration of the use of inverters, a ceiling height of less than 2.8m requires fire protection. See 4.3.5.

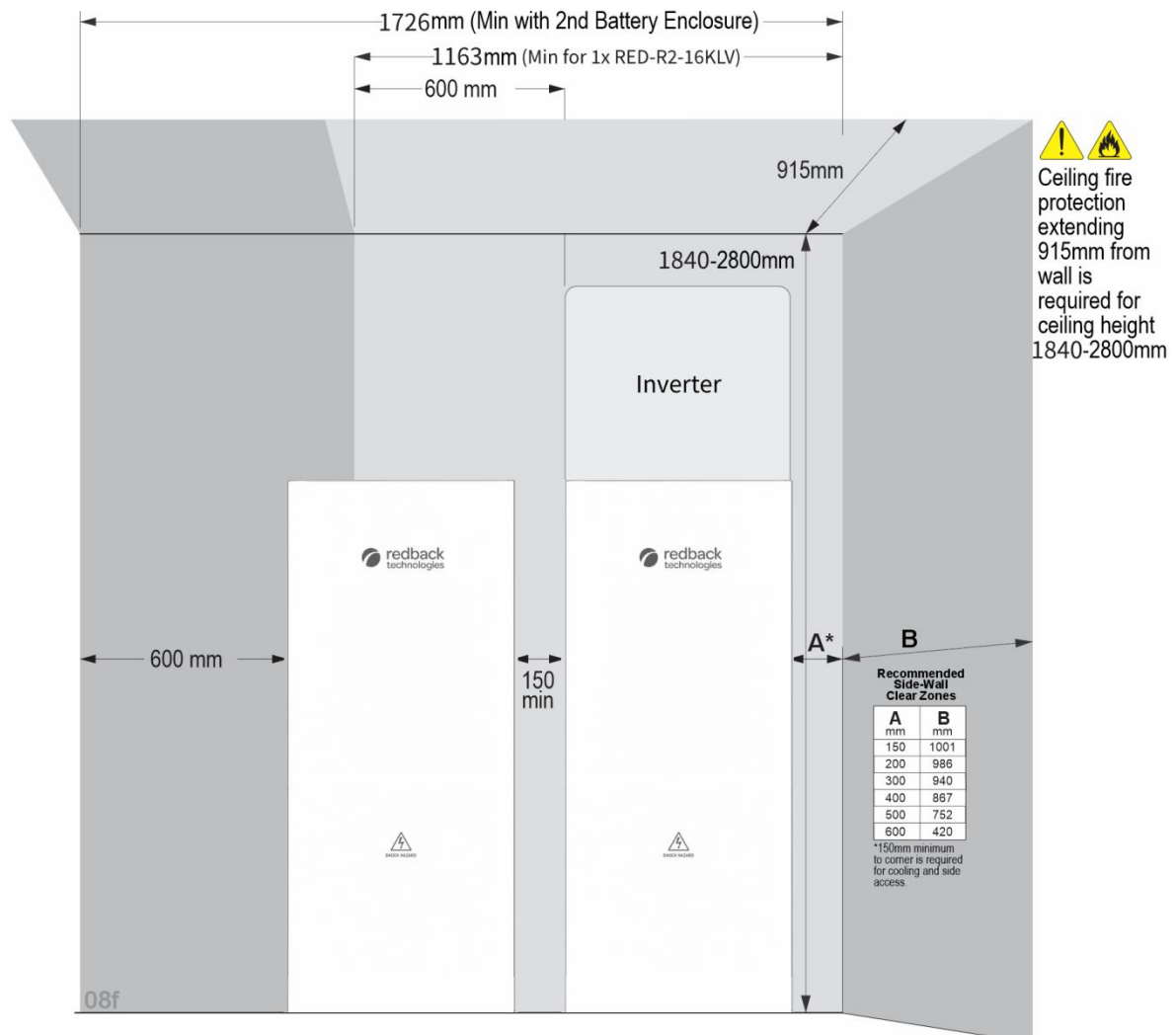


#### 4.3.4. INSTALLATION ON A LOW, BLANK WALL





#### 4.3.5. INSTALLATION NEAR A LOW CEILING CORNER

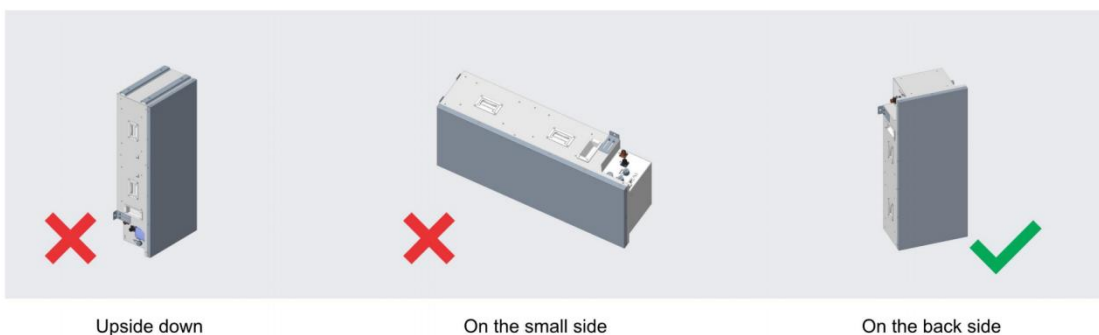


#### 4.4. Position of Batteries

As shown below, batteries must be used standing on the back face, or battery is lying flat with the logo side facing up. No other positions are permitted.

Each battery weighs 127kg: select a rack or shelf system that supports this weight. Do not stack anything directly on top of any battery, including other batteries, or tools, even temporarily.

For cooling, do not stack or arrange batteries without a minimum 100mm gap between the largest sides.



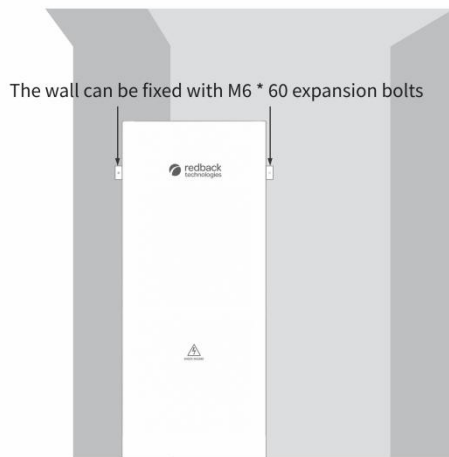
## 5. Installation

### 5.1. Before you begin ...

- Ensure all sources of power are disconnected from the battery enclosure, rack or shelves.
- Unbox each battery. Inspect each battery for damage. Contact the supplier if any damage is observed.
- Cross-check the packing list and the box contents. Contact the supplier if any parts are missing.
- Ensure all batteries are OFF, indicated by no illuminated LEDs. If necessary, switch batteries Off by pressing the POWER switch once.

### 5.2. Fixation of the battery

- After placing the battery, make sure it is stable and does not shake.
- The left and right sides of the battery have ears fixed to the wall. If necessary, they can be fixed to the wall with M6 \* 60 expansion bolts, with a torque of 8N · m.

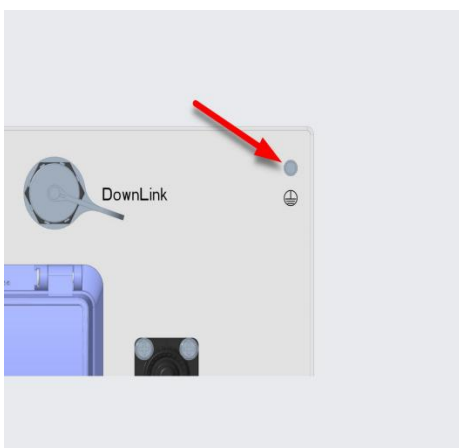


### 5.3. Grounding

Note: in this section, ground and earth have the same meaning. The battery features one grounding connection points.

- M5 grounding terminal on the battery side.

Grounding cables are supplied with Redback battery enclosures. For other enclosure or rack types, the installer must fabricate grounding cables of 16mm<sup>2</sup> or higher, with yellow-green cable.



The battery must be grounded to Permanent Earth (PE) to ensure user protection, equipment protection, and correct operation of the BMS.

### 5.3.1. REDBACK ENCLOSURE AND INVERTER

Batteries are earthed to the Redback inverter. The connection to PE is made via the AC Grid connection to the Main Switchboard. Consult the relevant Redback Installation Manual for a comprehensive description.

one 500mm earth cables are supplied with each Redback battery enclosure. Attach a cable to each battery earth terminal.

1. Earthing posts are provided inside the Redback enclosure. Connect the free end of the cable to a nearby post.
2. After installing the Redback inverter, connect the battery earth terminal to the inverter earth terminal, using the earth cable.
3. Test the earthing of each battery. The resistance between the battery earth terminal and a known good PE point must be less than 0.1Ω.

## 5.4. BMS and DC connections

### 5.4.1. DC CABLE FABRICATION

DC cables are included with each 16KLV, to suit Redback enclosures. These may not suit other applications, which will require custom fabricated cables.

- The minimum cable size is 4AWG or 25mm<sup>2</sup>, and this must be reviewed for cable runs over 2m.
- Cables must be terminated at the battery end with plugs compatible with:
  - Positive: Gu PS080C035ORB-01.
  - Negative: Gu PS080C035BKA-01.

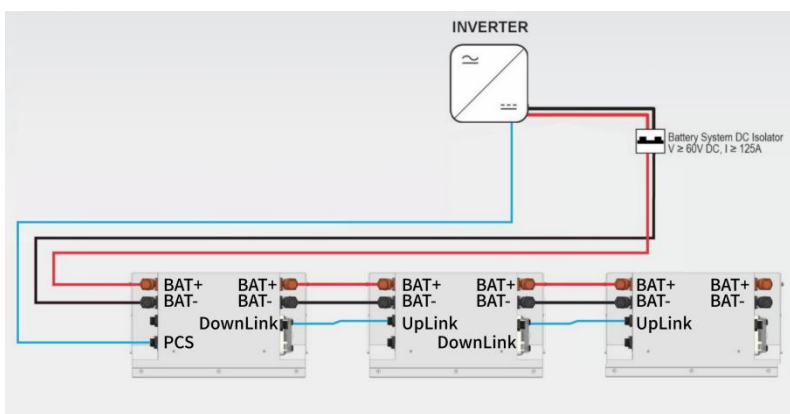
 The 16KLV battery's embedded BMS is designed for 48VDC.  
**DO NOT** connect batteries in series.

### 5.4.2. Battery and inverter connection

The battery can be used in parallel with multiple pieces. After connecting with the inverter, the inverter can monitor the battery in real time. The following steps are required for connection.

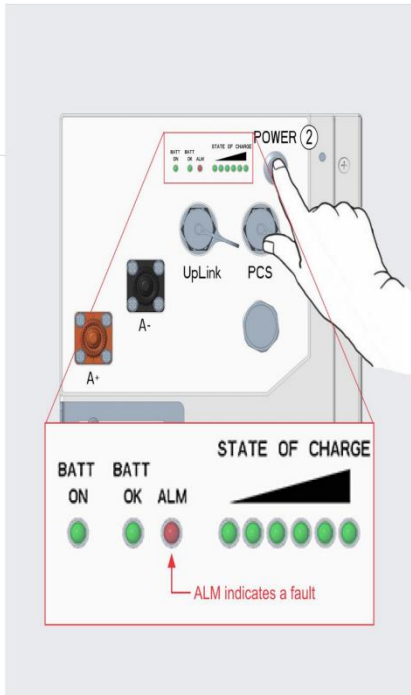
1. The previous battery "+" needs to be connected to the next battery "+" pole, and the previous battery "-" needs to be connected to the next battery "-" pole.
2. The previous battery "DownLink" needs to be connected to the next battery "UpLink". The "UpLink" of the first battery and the "DownLink" of the last battery do not need to be connected.
3. The "+" pole "-"pole of the first battery needs to be connected to the inverter battery port input "+" and "-"pole.
4. The "PCS" port of the first battery is connected to the "BMS" port of the inverter.
5. Close the battery DC-Isolator and press and hold the battery button to activate it.
6. Power on the inverter.

After completing the above operations, the inverter and battery are fully connected, and the battery will be monitored in real time by the inverter.



## 6. Battery operation

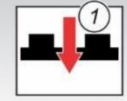
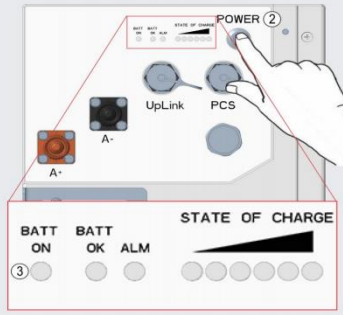
### 6.1. Starting the batteries

| STEP | DESCRIPTION                                                                                                                                                                                                                                                                                                                                                                                                                   | ILLUSTRATION                                                                          |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 1    | Disconnect the battery DC-Isolator.                                                                                                                                                                                                                                                                                                                                                                                           |   |
| 2    | Press POWER on the master battery. All batteries will start.<br><br>The LEDs will flash and settle: <ul style="list-style-type: none"><li>. BATT ON LED should be green</li><li>. BATT OK LED should be green</li><li>. STATE OF CHARGE LEDs vary- Up to six LEDs may be illuminated.</li><li>. If the ALM LED remains ON or flashing, there is a battery problem. See sections 7.2 and or 8.2 for troubleshooting.</li></ul> |                                                                                       |
| 3    | If batteries appear OK, closed battery DC-Isolator.                                                                                                                                                                                                                                                                                                                                                                           |  |
| 4    | If required, configure the batteries in the inverter software.                                                                                                                                                                                                                                                                                                                                                                |                                                                                       |

## 6.2. Battery functions during running

- The battery LEDs provide status information about the individual batteries, as listed in section 7.2.
- The inverter has overall control of the battery stack, and battery stack status will be available at the inverter or in companion software.

## 6.3. Shutting down batteries

| STEP | DESCRIPTION                                                                                                                                                 | ILLUSTRATION                                                                                                                |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| 1    | Disconnect the battery DC-Isolator.<br>DC- Isolator operates to isolate both positive and negative pole.<br>Hence, no access to live parts once turned off. | <br>BATTERY SYSTEM<br>DC ISOLATOR<br>41a |
| 2    | Press POWER on the master battery.                                                                                                                          |                                         |
| 3    | LEDs on all batteries should go off, indicating all batteries are off.                                                                                      |                                                                                                                             |

## 7. Adding or replacing batteries

A new battery module can be added to an existing system, space permitting, up to fifteen modules.

- The newest battery must become the master battery (first in BMS chain of command)
- The new module, due to a higher SoH may have a difference on SoC with existing system.
- After adding new batteries, they should be allowed to balance.

 Inspect all batteries in the stack at every opportunity. Early detection and replacement of damaged batteries will enhance the system performance and help get the most out of the new batteries being added.

### TO ADD OR REPLACE BATTERIES

1. Isolate the battery stack from the inverter.
2. Identify and remove batteries as required.
3. Take the opportunity to examine remaining batteries for damage or swelling.
4. Install the new batteries, rearranging the stack to make the newest the Master.
5. Turn on the Master. Observe LEDs.
6. Turn on the Workers. Observe LEDs.
7. If no faults or alarms are observed, allow the battery SoCs to balance: this is indicated by an equal number of SoC LEDs ( $\pm 1$ ) being activated on all batteries.
8. De-isolate the battery stack from the inverter.
9. If necessary, update the battery configuration in the inverter software.

## 8.1. LED indications

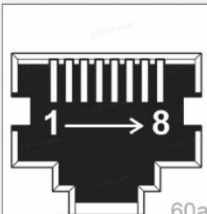
| BATTERY STATUS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | LED NAME                                                                            |                                                                                   |                                                                                   |                                                                                                                                                              |                                                                                     |                                                                                       |                                                                                       |                                                                                       |                                                                                       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ON/OFF                                                                              | RUN                                                                               | ALM                                                                               | L1                                                                                                                                                           | L2                                                                                  | L3                                                                                    | L4                                                                                    | L5                                                                                    | L6                                                                                    |
| Shutdown                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | -                                                                                   | -                                                                                 | -                                                                                 | -                                                                                                                                                            | -                                                                                   | -                                                                                     | -                                                                                     | -                                                                                     | -                                                                                     |
| Standby                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |    |  | -                                                                                 | Shows SoC. LEDS are Green, continuous.                                                                                                                       |                                                                                     |                                                                                       |                                                                                       |                                                                                       |                                                                                       |
| Low voltage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |    |  |  |                                                                                                                                                              |                                                                                     |                                                                                       |                                                                                       |                                                                                       |                                                                                       |
| Charge                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |    |  | -                                                                                 | Shows SoC. LEDS are green and highest SoC LED is in a long flash pattern  |                                                                                     |                                                                                       |                                                                                       |                                                                                       |                                                                                       |
| Charge alarm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |    |  |  |                                                                                                                                                              |                                                                                     |                                                                                       |                                                                                       |                                                                                       |                                                                                       |
| Overcharge alarm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |  | -                                                                                 |                                                                                                                                                              |                                                                                     |                                                                                       |                                                                                       |                                                                                       |                                                                                       |
| Overcharge protection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |    |  | -                                                                                 |                                                                             |    |    |    |    |    |
| Charge protection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |    | -                                                                                 |  | -                                                                                                                                                            | -                                                                                   | -                                                                                     | -                                                                                     | -                                                                                     | -                                                                                     |
| Discharge                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |    |  | -                                                                                 | Shows SoC. LEDS are Green, continuous.                                                                                                                       |                                                                                     |                                                                                       |                                                                                       |                                                                                       |                                                                                       |
| Discharge alarm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |    |  |  |                                                                                                                                                              |                                                                                     |                                                                                       |                                                                                       |                                                                                       |                                                                                       |
| Under-voltage protection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    | -                                                                                 | -                                                                                 | -                                                                                                                                                            | -                                                                                   | -                                                                                     | -                                                                                     | -                                                                                     | -                                                                                     |
| Discharge protection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |    | -                                                                                 |  | -                                                                                                                                                            | -                                                                                   | -                                                                                     | -                                                                                     | -                                                                                     | -                                                                                     |
| Fail                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | -                                                                                   | -                                                                                 |  | -                                                                                                                                                            | -                                                                                   | -                                                                                     | -                                                                                     | -                                                                                     | -                                                                                     |
| SoC <18%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  | nr                                                                                | nr                                                                                |                                                                           | -                                                                                   | -                                                                                     | -                                                                                     | -                                                                                     | -                                                                                     |
| SoC 18-33%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  | nr                                                                                | nr                                                                                |                                                                           |  | -                                                                                     | -                                                                                     | -                                                                                     | -                                                                                     |
| SoC 34-50%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  | nr                                                                                | nr                                                                                |                                                                           |  |  | -                                                                                     | -                                                                                     | -                                                                                     |
| SoC 51-66%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  | nr                                                                                | nr                                                                                |                                                                           |  |  |  | -                                                                                     | -                                                                                     |
| SoC 67-83%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  | nr                                                                                | nr                                                                                |                                                                           |  |  |  |  | -                                                                                     |
| SoC >83%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  | nr                                                                                | nr                                                                                |                                                                           |  |  |  |  |  |
| Legend:  LED on continuous green  LED Short Flash Green 0.25s ON, 3.75s OFF  LED Long Flash 0.5s ON, 0.5s OFF  LED Slow Flash Green 0.5s ON, 1.5s OFF<br> LED on continuous red  LED Slow Flash Red 0.5s ON, 1.5s OFF |                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                              |                                                                                     |                                                                                       |                                                                                       |                                                                                       |                                                                                       |
| ALM LED indication notes: <ul style="list-style-type: none"><li>• The ALM LED can be enabled or disabled by the host computer. Factory default is enabled.</li><li>• ALM does not flash during an overcharge alarm.</li><li>• If overcharge protection is active, and the inverter is disconnected, the ALM LED will indicate Standby.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                              |                                                                                     |                                                                                       |                                                                                       |                                                                                       |                                                                                       |

## 8.2. Ports

### 8.2.1. PCS PORT

On the master battery only, the PCS interface is used to communicate with the inverter.

PCS ports have RS485@115200bps and CAN@500kbps transmit all battery information to the inverter.

| PIN ASSIGNMENTS |         | ILLUSTRATION                                                                        |
|-----------------|---------|-------------------------------------------------------------------------------------|
| PIN             | USAGE   |  |
| 4               | CANH    |                                                                                     |
| 5               | CANL    |                                                                                     |
| 6               | GND     |                                                                                     |
| 7               | RS485-A |                                                                                     |
| 8               | RS485-B |                                                                                     |

### 8.2.2. UP LINK (PARALLEL COMMUNICATION PORT)

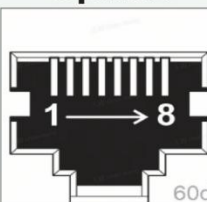
For communication between multiple parallel batteries.

Master Battery: UP LINK is vacant.

Worker batteries: UP LINK connects to DOWN LINK of the previous battery.

Includes RS232 communication.

For manufacturing, diagnostic or service use only.  
Use for changing internal buzzer defaults

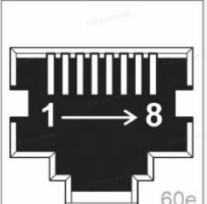
| PIN ASSIGNMENTS |         | ILLUSTRATION                                                                         |
|-----------------|---------|--------------------------------------------------------------------------------------|
| PIN             | USAGE   |  |
| 1               | RS485-B |                                                                                      |
| 2               | RS485-A |                                                                                      |
| 3               | 232-TX  |                                                                                      |
| 4               | 232-RX  |                                                                                      |
| 5               | UP_IN   |                                                                                      |
| 6               | GND     |                                                                                      |

### 8.2.3. DOWNLINK(PARALLEL COMMUNICATION PORT)

For communication between multiple parallel batteries.

Master Battery: DOWN LINK connects to UP LINK of the first worker battery.

Worker batteries: DOWN LINK connects to UP LINK of the next battery, except that the final battery has DOWN LINK vacant

| PIN ASSIGNMENTS |         | ILLUSTRATION                                                                          |
|-----------------|---------|---------------------------------------------------------------------------------------|
| PIN             | USAGE   |  |
| 1               | RS485-B |                                                                                       |
| 2               | RS485-A |                                                                                       |
| 5               | DN_OP+  |                                                                                       |
| 6               | GND     |                                                                                       |

### 8.2.4. DC POWER SOCKETS

#### DESCRIPTION

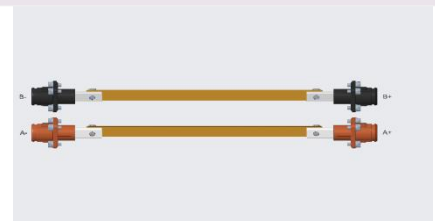
Four DC Sockets are available on the cabinet.

The positive sockets A+ and B+ are bonded internally. A- and B- are also bonded internally.

This internal bonding affords the paralleling of up to 15 batteries.

The sockets are Gu. Connecting cables must be finished with: positive PS080C035ORB-08 and negative PS080C035BKA-08 uitable latching plugs.

#### ILLUSTRATION



## 9. Troubleshooting

Troubleshooting, testing and charging of batteries must be performed by authorised, trained technicians only.



Redback batteries work with compatible inverters, as nominated by Redback. Other systems may not work or not work as expected.

### 9.1. Communications issues

| ITEM | INDICATION                                        | REASON                                               | ACTION REQUIRED                                                                                                                                                                           | FURTHER ACTION                                                                                   |
|------|---------------------------------------------------|------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| 1    | PV system is unable to communicate with batteries | System is not compatible with the Redback batteries. | Ensure your system meets the hardware requirements specified by Redback.                                                                                                                  |                                                                                                  |
|      |                                                   | System is configured incorrectly                     | RS485 Baud rate: Ensure the selected rate is compatible with the inverter.<br>CAN: Requires CAN-H, CAN-L and GND pins only. If using a self-fabricated cable, do not connect other wires. | Try different batteries as the Master (to eliminate a faulty battery).<br>Try a different cable. |

### 9.2. Electrical issues

| ITEM | INDICATION                                                         | REASON                                                         | ACTION REQUIRED                                                                                        | FURTHER ACTION                                                                     |
|------|--------------------------------------------------------------------|----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| 1    | No LEDs are illuminated                                            | Battery is OFF                                                 | Press POWER switch once                                                                                |                                                                                    |
|      |                                                                    | Battery voltage is too low, or battery is discharged or faulty | Use a charger or inverter to apply 48-57.6V to battery (observe polarity).<br>Press POWER switch once. | If battery activates, charge <sup>1</sup> the battery, otherwise contact supplier. |
| 2    | ALM LED is ON or flashing red                                      | Temperature is outside operating range                         | Ensure the operating environment is -20°C to +55°C.                                                    |                                                                                    |
|      |                                                                    | Discharge current exceeds 115A                                 | Reduce inverter maximum discharge rate                                                                 |                                                                                    |
|      |                                                                    | Charge current exceeds 115A                                    | Reduce inverter maximum charge rate                                                                    |                                                                                    |
|      |                                                                    | Internal damage.                                               | Replace or repair battery.                                                                             | Contact supplier.                                                                  |
|      |                                                                    | Battery is connected incorrectly                               | Check polarity and condition of all connections.                                                       |                                                                                    |
| 3    | ALM LED is always ON, and battery cannot be charged or discharged. | Internal fuse activated: there is no temperature protection.   | Turn off battery.                                                                                      | Contact supplier.                                                                  |
| 4    | Battery appears normal but cannot charge                           | Battery or an individual cell is overcharged.                  | Stop force charging. Allow battery to discharge normally.                                              |                                                                                    |

<sup>1</sup> Standard charging is carried out at 0.5C. When the battery pack voltage reaches the upper limit voltage, change to constant voltage charging until the charging current is less than or equal to 0.02C to stop charge.



## 10. Maintenance

### 10.1. General safety warnings



Authorised persons. Servicing of batteries, including inspection and cleaning, must be performed or supervised by trained, authorised technicians.



LIKE-FOR-LIKE REPLACEMENT: When replacing batteries, replace with the same type and number of batteries or battery packs, except where the manufacturer has advised otherwise.



WARNING. No user serviceable parts inside. Do not open case or disassemble. Unauthorised access voids the warranty and may create affect the correct functioning of the battery or may create a hazardous situation.



CAUTION: Do not dispose of batteries in a fire. The batteries may explode.



CAUTION: Do not open or damage batteries. Released electrolyte is toxic and harmful to the skin and eyes.



CAUTION: Batteries are heavy! Seek assistance when lifting or handling batteries.

### 10.2. Storage and Maintenance



MEMORY EFFECT. Batteries must be recharged to 5% Minimum SoC within 12 hours of a full discharge event. Owners may be able to place their inverter in “Force Charge” mode to achieve this, noting that forced charging may consume power from the grid. Consult your inverter documentation or supplier for advice. Note: A full discharge event occurs when the battery reaches its minimum allowable SoC, and can no longer provide energy to the system: usually this would only occur when a system is off-line and in backup mode.



QUARTERLY CHARGING. To protect the battery, the battery must be charged to 40% SoC or higher every three months (this should not be required during normal day-to-day usage).



CLEANING. Wipe down or dust off the outside of the casing using a dry cloth or soft dry brush. Do not use water, detergents, solvents or any other product.

ANNUAL INSPECTION. Check the following items:



- . DC and communications plugs, cables and connections are in good condition.
- . Physical damage or swelling.
- . Inspect rack mounting screws, if fitted.
- . Inspect and test grounding of batteries and rack to permanent earth.
- . Are there signs of excessive water or dust, or insect or vermin activity around the batteries or inside enclosures. The environment must maintain adequate protection for the batteries.

### 10.3. Disposal



DO NOT PLACE LITHIUM BATTERIES IN GENERAL WASTE. Lithium batteries contain hazardous chemicals and recyclables and must be disposed of as specified by local regulations. Contact your local government authority for disposal advice or find a local recycling service that accepts lithium batteries.



CAUTION: Do not dispose of batteries in a fire. The batteries may explode.



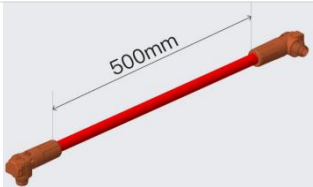
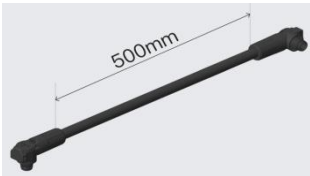
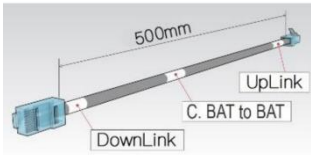
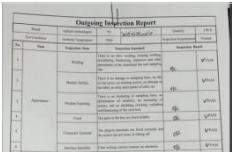
CAUTION: Do not open or damage batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.

## 11 . Specification

| PARAMETERS                               | RED-R2-16KLV                                     |
|------------------------------------------|--------------------------------------------------|
| Nominal Voltage                          | 51.2 VDC                                         |
| Max Voltage                              | 58.4VDC                                          |
| Min Voltage                              | 46.4VDC                                          |
| DC Power                                 | 4.6kW                                            |
| Nominal Capacity                         | 16000Wh                                          |
| Usable Capacity                          | 15200 Wh                                         |
| Depth of discharge                       | 95%                                              |
| Dimensions HxWxD                         | (970 ± 3 ) * ( 413 ± 2 ) * ( 243±2) mm           |
| Weight                                   | 127kg                                            |
| Recommended Charge/Discharge Current     | 100A <sup>1</sup>                                |
| Max. continuous Charge/Discharge Current | 100A <sup>1</sup>                                |
| Communication                            | RS485, CAN, RS232                                |
| Configuration                            | 16S                                              |
| Working Temperature Charging             | 5°C ~ 55°C                                       |
| Working Temperature Discharging          | -20°C ~ 55°C                                     |
| Storage Temperature                      | -20°C ~45°C(1 month) 0°C ~35°C(1 year)           |
| Cooling type                             | Natural                                          |
| Protective class                         | I                                                |
| IP rating of enclosure                   | IP65                                             |
| Humidity                                 | 5% ~ 95%(RH) No Condensation                     |
| Altitude                                 | <2000m                                           |
| Certification                            | CB, CE-LVD, CE-EMC                               |
| Warranty duration                        | 10 years                                         |
| Warranted Min/max temperature            | -20°C ~55°C                                      |
| Warranted throughput                     | 3.65MWh/kWh                                      |
| Country of origin                        | China                                            |
| Warranted usable capacity at 10 years    | 70 %                                             |
| Reference standards                      | IEC62619, IEC62040-1, IEC61000-6-1, IEC61000-6-3 |

<sup>1</sup> The charge and discharge currents are derated when the cell internal temperature is outside the nominated working temperature. The internal temperatures may be greater or lesser than ambient temperature.

## 12. Packing List

| PART                                                                                               | ILLUSTRATION                                                                         | QUANTITY |
|----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|----------|
| Battery Module                                                                                     |     | 1        |
| Cable D<br>25mm <sup>2</sup> DC cable; 500mm.<br>2x orange Gu plugs. Connects to previous battery. |    | 1        |
| Cable E<br>25mm <sup>2</sup> DC cable; 500mm.<br>2x black Gu plugs. Connects to previous battery.  |    | 1        |
| CABLE F<br>RJ45 communication cable.<br>500mm long.<br>Connects to previous battery                |   | 1        |
| Battery Ground cable 500mm<br>Inverter-to-battery Earth Cable<br>500mm                             |  | 1        |
| Installation Manual                                                                                |  | 1        |
| Redback Product Warranty Card                                                                      |   | 1        |
| Test Result                                                                                        |  | 1        |