RedEarth
ENERGY STORAGE

Gecko

Installation and Operation Manual

RedEarth's Gecko battery energy storage systems offer Australian-made scalability, making them an excellent and enduring investment for your home.

Available in both single and three-phase configurations, Gecko provides a range of power outputs tailored to accommodate your specific needs.

Gecko is outdoor rated IP43 with a maximum capacity of 8 Troppo ULTRA batteries – 44.8 kWh capacity.

Fast Installs

One Pallet

Plug 'n' Play

AUSTRALIAN MADE AND OWNED
CLEAN ENERGY COUNCIL MEMBER
SMART ENERGY COUNCIL
ISO 9001:2015 COMPANY
ISO 14001:2015 COMPANY
ISO 45001:2018

Safety Instructions

⚠ WORKING ON THE INSIDE OF THE GECKO SYSTEM IS RESTRICTED TO QUALIFIED PERSONNEL.

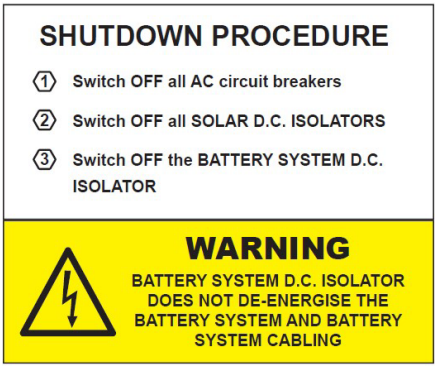
General Safety Notes

FIRE
The Gecko uses RedEarth's Troppo ULTRA batteries. This is a lithium-iron-phosphate based battery (LFP). It is the safest lithium chemistry.
However, in the unlikely event of a fire, or if the unit emits smoke, sparks, flames, or vapour, produces a burning smell, becomes excessively hot or swells, leaks, or makes unusual noises,
IMMEDIATELY:

- **Evacuate the area.** Move yourself and others to a safe distance.
- **Call Emergency Services (000).**
- **Do NOT attempt to extinguish the fire.**
- **Do NOT touch, move, or handle the system or the batteries.**
- **Do NOT use water or household extinguishers unless trained and safe to do so.**

Battery fires can reignite and may release toxic and flammable gases. Always prioritise personal safety.
Note: the Safety Data Sheet for the Troppo ULTRA battery must be left with the Main SwitchBoard for the fire brigade.
The Safety Data Sheet can also be found at https://redearth.energy/troppo-ultra-safety-data-sheet/

- The Gecko must only be installed by suitably qualified personnel who have read and are familiar with its operation and hazards. Working on the inside of the Gecko system is restricted to qualified personnel.
- The batteries provided with this system must only be charged by the inverter or the V2G (vehicle to grid) charger supplied by RedEarth. Do not attempt to charge the batteries with any other charging device or connect any devices directly to the DC battery bus unless approved by RedEarth.
- Do not use a damaged battery.
- Batteries should only be disposed of at an appropriate recycling centre. Contact RedEarth for advice.
- The shutdown procedure can be found on the label on the right-hand side of the Gecko. More details in Step 4 of the installation and customer handover.



Installation Safety Notes

- The wiring diagrams and installation instructions are given as a guide only and compliance to appropriate standards is the responsibility of the installer. Relevant standards are listed below:

AS/NZS 3000:2018	Wiring rules
AS/NZS 5033:2021	Installation and safety requirements for photovoltaic (PV) arrays
AS/NZS 4509.2:2012	Stand-alone power systems-Design
AS/NZS 1170.2:2021	Structural design actions-Wind actions
AS/NZS1768:2021	Lightning protection
AS/NZS 3008.1.2:2017	Electrical installations – Selection of cables
AS/NZS 5139:2019	Electrical installations – Safety of battery systems for use with power conversion equipment

- A battery can present a risk of electrical shock and high short-circuit current. The following precautions should be observed when working on batteries:
  - Remove watches, rings, and other metal objects.
  - Use tools with insulated handles.
  - Disconnect charging source prior to connecting or disconnecting battery terminals
- Lifting hazard
  The Gecko is heavy. Observe proper lifting techniques. To reduce the weight the Troppo ULTRA batteries can be removed.

In our efforts towards constant product enhancement, this document is subject to change at any time. Please visit www.redearth.energy and download the appropriate and latest version manual.

Table of Contents

Overview

Gecko is an Australian-made residential hybrid power system designed to integrate multiple energy functions into a compact installation footprint. It incorporates solar power generation, battery energy storage, power conversion and energy management. Optional add-on modules include an EV charger or V2G (Vehicle to Grid) bi-directional charger.

Gecko is suitable for both on-grid and off-grid applications and is available in the following inverter configurations:

- Single-phase: 5 kW or 10 kW
- Three-phase: 12 kW or 15 kW

The system can source energy from PV solar, the grid, or a standby generator, and stores excess energy during the day for use during evening and peak periods. It supports whole-home backup, ensuring critical and general household loads remain energised during a grid outage.

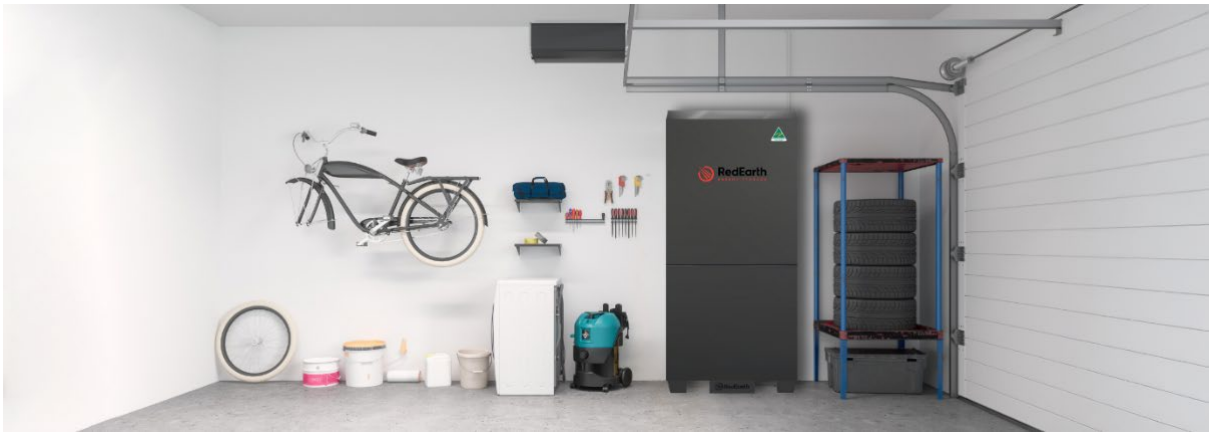
Up to 24 kW of panels can be connected to the 15 kW 3-phase Gecko and 20 kW of panels to the 10 kW 1-phase Gecko. This is usually enough to meet the needs of a typical home as well as charge an electric vehicle, using only electricity generated at home. The Gecko system can easily be retrofitted to an existing PV solar system that may already be installed at the home.

For residential users, Gecko reduces electricity costs, optimises daily energy usage—including EV charging—and contributes to lowering the home's carbon footprint.

Monitoring and control of the system is provided through RedEarth's app, available for both Apple and Android devices.

Gecko components are fully certified to AS4777.2:2020 & IEC62109.1&2 & AS60950.1 and conform to the Australian Battery Safety Guide.

The system is supplied with a **10-year manufacturer's warranty,** supported by RedEarth's onshore technical service team to ensure reliable long-term performance and a seamless installation and ownership experience.



RedEarth's Private Power Plant (PPP)

RedEarth offers its propriety Private Power Plant (PPP) to generate more value for Gecko battery system owners than is available from other battery systems.
With a Gecko installed, they not only gain access to a continuous source of renewable energy; by harnessing the untapped potential of their rooftop, they can generate more solar energy than needed to power their residence or business. The result? Their property can become their very own energy trader, creating an additional value stream by feeding surplus energy back into the grid or sharing it with family. This not only offsets energy costs but could even turn a profit.

Included PPP modules currently available are:

1. **PowerRanger**—The Power Ranger module gives you the ability to manually (or on an automated schedule) force charge or discharge the battery.
   This means power to:
   - choose to charge the batteries before a scheduled grid outage.
   - charge the batteries on a schedule if there are not enough solar panels on the roof.
   - manually charge on a one-off cloudy day
2. **Disaster Protection Mode**— When severe weather or other conditions are expected to cause grid outages, this mode ensures the batteries are fully charged to last as long as possible during the interruption.
3. **Scheduled EV charging**— View EV charging in real time through the RedEarth app, together with Gecko monitoring. Determine the best time to charge the EV and set the charge rate.
   With the addition of the Boomerang V2G, it can also discharge the vehicle. This can be especially valuable when off grid, either voluntarily or when storms bring down power lines, as it provides direct access to the large battery in the electric vehicle.
4. **Peer-to-peer electricity trading**—Trade excess electricity with other people at a price agreed on, for free to help out peers or family or for a second property, such as a rental property. This feature is available provided it is supported by the energy retailer.
5. **Manual Energy Trading**—Sell excess electricity at a profit at peak times.

Gecko system owners can join RedEarth's Smart Energy Trading program, which uses our proprietary trading algorithms to maximise their returns. Customers can register directly through the RedEarth app—the same platform they already use to monitor their Gecko.
Smart Energy Trading requires a suitably sized Gecko system and a wholesale energy retailer. Our support team can confirm whether the system meets the requirements.

Smart Energy Trading PPP modules currently available include:

1. **Access to wholesale electricity pricing**— RedEarth can assist in transitioning from a standard electricity plan to wholesale pricing through a wholesale energy retailer. This shift can lower the average energy costs, when the Gecko system provides electricity during periods of high market prices.
2. **Automatic Energy Trading**— Sell excess electricity at peak times using RedEarth's proprietary automated trading algorithms. The system identifies the best moments to buy and sell, maximising the financial return.
6. **Smart EV charging**—RedEarth's algorithm determines the optimal time to charge.
   When paired with the Boomerang V2G (Vehicle-2-Grid), the system can also discharge the vehicle, providing an additional energy source from the large battery in an electric vehicle during off-grid operation or storm-related outages.

RedEarth continues to develop new PPP modules, each designed to deliver specific benefits depending on whether the system is on-grid or off-grid and on the size of the Gecko system.

Gecko System Description

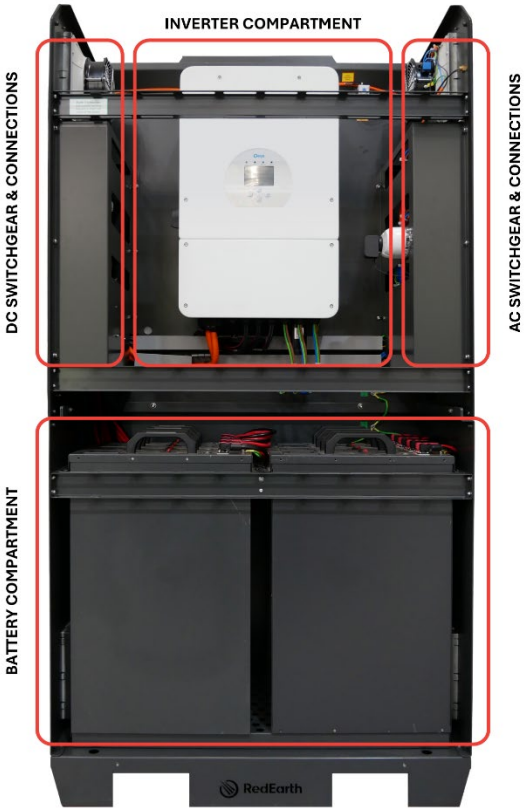
Opening the Gecko

RedEarth's Gecko Home battery system can be accessed by removing the upper (inverter compartment) and lower (battery compartment) lids. To remove the upper compartment lid, remove the six (6) M6 screws with an Allen Hex driver (HEX4), lift and pull the cover away from the unit and place in a safe location. If access to the battery compartment is required for installation or maintenance, do this by removing the six (6) M6 screws with an Allen Hex driver (HEX4).

> ⚠ Removal of the covers must only be done by qualified personnel.

Inside layout

The Gecko is divided into four main areas. The lower section is the battery compartment, in the top middle section is the inverter compartment. On the right side are the AC electrical components, cable connection, and communication device and lastly on the left side are the DC electrical components and cable connection points for installation.
Prior to leaving the factory the system is tested. It leaves the factory with the inverter cabling fully connected and ready-to-run. The batteries are removed for transportation.



Battery Compartment

Up to eight (8) RedEarth Troppo ULTRA 5.6 kWh Lithium batteries can be installed in the Gecko.
All eight sets of battery cables are pre-wired into the system. This makes it very easy to add additional batteries in the future.
Note: that the battery modules are shipped in a separate box and installed during installation.

Inverter Compartment

Here you will find the Deye Inverter (5 kW, 10 kW for 1-Phase and 12 kW, 15 kW for 3-Phase). All the internal connections from the inverter to the AC and DC switchgear is completed in the factory, and the fans, thermostat, GPO and RUT Comms device are pre-wired, so there is no internal installation wiring to be done in this area.

Electrical Isolation & Connections (AC & DC)

These areas are designed for easy access to all the switchgear and wiring, like a typical switchboard.

To access the AC switchgear, open the right-hand side access door and remove the escutcheon panel (4 x M5 screws). Here you will find all the AC protection devices and AC connection points needed to wire in the system during installation. Below the AC escutcheon panel is the Comms access panel (2 x M5 screws), in this location is the user accessible Comms device, the RUT.

The DC switchgear is accessed on the left-hand side of the unit. Open the left side access door and remove the escutcheon panel (6 x M5 screws). This is where the DC protection and PV connection points are located.

There are labels to clearly identify where cables are to be connected during installation.

Note: The switchgear and connection point locations for both 1-phase and 3-phase systems are the same.
Below example is for a 3-phase system.

DC SWITCHGEAR AND CONNECTION POINT LOCATIONS

AC SWITCHGEAR AND CONNECTION POINT LOCATIONS

Parts Kit and Documentation

The Gecko is supplied with documentation and a parts kit box to complete the installation.

Documentation

- ❑ Gecko Installation Manual (this document)
- ❑ Gecko User Guide
- ❑ Gecko customer Handover Checklist
- ❑ Gecko Identification Sheet (serial #s etc.)
- ❑ SDS Troppo ULTRA Battery (Safety Data Sheet).
  Note: This SDS must be left with the Main SwitchBoard for the fire brigade.
- ❑ Deye Inverter User Manual
- ❑ Eastron Feed-in Meter Manual
- ❑ Warranty terms

Parts Kit Box

- Documentation listed above.
- Feed-in meter (Eastron 1-phase or 3-phase version) for installation in the switch board plus CTs to connect to the meter (one for 1-phase or three for 3-phase)
  Note: a Cat5/6 cable or similar is required to connect the feed-in meter back to the Gecko system. This cable is NOT supplied and needs to be provided by the installer.
- 1 x 1 m Ethernet cable for connecting the battery banks
- Stickers and Traffolytes required to complete the installation
- 4 x Dynabolts and 6 x Concrete bolts for securing the Gecko system to the wall and ground
- Set of levelling shims
- 7 x M25 glands (suitable for sealing around 25 mm flexible conduit)
- 2 x M32 glands (suitable for sealing around 32 mm flexible conduit)
- 7 x M25 plugs
- 2 x M32 plugs
- 4 x M8 screws with washers & spring washers
- 16 x M6 screws
- 1 x Screw-in Wi-Fi antenna
- 1 x Screw-in 4G antenna
- 1 x Extension 4G antenna
- Suitable circuit breakers for installation into the switchboard to isolate the Gecko in MSB
- 2 x Wall brackets

Overview of Installation Tasks

Preparing for an Installation

- Decide on the location of the Gecko, using the information in Step 2: Positioning and Mounting.
- Depending on the site and installation, decide on the length and size of the cables to run.
    - The cables for connecting the MSB to the GRID, SMART PORT and LOAD terminals must be sized to support the installation of the 5 kW, 10 kW, 12 kW or 15 kW inverter according to AS/NZS 3008.1.1:2017.
    - 40 A or 50 A MCBs are installed in the Gecko, depending on the kW rating of the inverter.
- If a generator is part of the installation, ensure it is a **G3 rated generator** (find more information @ https://redearth.energy/support/)
- Plan the PV solar installation.
    - PV modules must have an IEC61730 Class A rating.
    - PV racking and solar panels should be designed and installed in accordance with AS/NZS 5033 and the latest CEC Installation guidelines.
    - In selecting PV panels and the wiring method, ensure Open Circuit Voltage (V_{OC}) and Short Circuit Current (I_{SC}) ratings are not exceeded.
    - Ensure that the array is within the inverter specification and that the polarity of the array is correct.
    - It is important to connect PV strings of equal length and orientation when 2 strings are going into one MPPT.

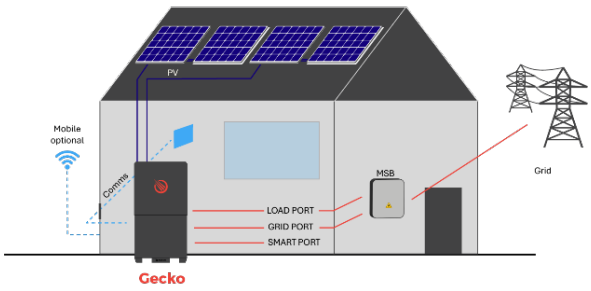
    Note: an example of string voltage calculations and string layout for Gecko systems using specifications of a typical 400 W solar panel can be found in the Appendix.
- When you know the installation date, book the time with RedEarth so that they are sure to be available to help you and to confirm that the system and the remote monitoring is properly setup.

Electrical Connections

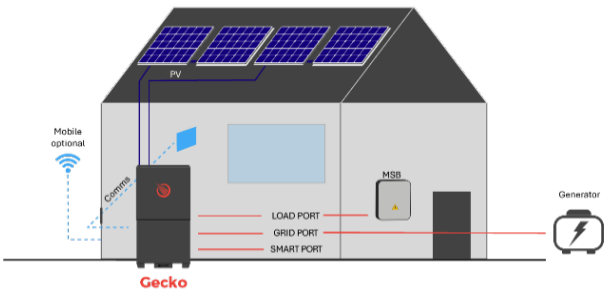
The Gecko can be installed as an on-grid or an off-grid installation. Both installations follow the same process, however in off-grid, there is no grid to connect or feed-in meter to install.

A typical complete installation of the Gecko home battery system will require the electrical connection of the following items:

On-grid example



Off-grid example



- **Batteries:** The Gecko is pre-wired for up to eight Troppo ULTRA batteries. Each Troppo ULTRA battery has a nominal capacity of 5.6 kWh. The batteries need to be installed and plugged in.

- **Grid:** AC cables run from the MSB (Main SwitchBoard) directly to the grid terminals inside the Gecko system. Ensure to observe the correct phase rotation in 3-phase system.
- **Load:** AC cables from the MSB connect directly to the Load terminals inside the Gecko system.
  The Gecko system is designed as a whole home backup system, however If the loads in a particular house are greater than the capacity of the Gecko system, it can also be set up as partial backed-up load.
  For partial back-up systems:
    - The loads inside the MSB need to be split.
    - Ensure that the backed-up circuits do not overload the Gecko system.
    - Loads such as pool pumps and under floor heating should probably not be backed up.
    - Putting too many loads on the backed-up circuit can also empty the battery quickly during an outage. Optionally consider using the Gecko's multi-purpose SMART Port to turn off non-essential loads at a pre-determined battery state-of-charge (SOC).
    - A Feed-in Meter/CT will be required.
- **Optional - SMART Port connection:** The Gecko system has a third AC connection option, the SMART Port that can perform different functions depending on how it is configured.
    - Generator: This mode will automatically call the generator when the SOC reaches a lower SOC (battery state of charge) and will stop the generator when the SOC reaches the higher SOC. If you require assistance adjusting these two set points, contact RedEarth tech support. The Gecko includes a 2-wire generator auto-start feature. ***By Default, the SMART port is configured to operate a Backup Generator, please notify RedEarth at the time of sale, or installation if you wish to adjust this***.
    - Smart Load: If connecting a smart load, run your designated smart circuit into the terminal labelled Smart / Gen. This load will run when the batteries are above a programmed SOC, and power down when the batteries fall below this SOC. For example, an air-conditioner could be powered via this SMART Port so that in a power outage it will continue running until the battery reaches a pre-programmed SOC.
      The SMART port can also be configured to always provide power to this circuit when the grid Is connected, independent of the battery SOC.
    - AC Coupled Solar: An AC coupled solar inverter, or micro-inverter can be connected into the terminal labelled Smart / Gen. This opens the opportunity to redirect the output of an existing PV system to this port, allowing it to be controlled by the Gecko system.
      It is important that the shutoff frequencies are set appropriately so that the Gecko system can correctly manage this extra AC-coupled PV system (consult RedEarth tech support).
      It is also essential that the AC coupled PV does not exceed a 1:1 relationship to the Gecko inverter size (5 kW or 10 kW for 1-phase & 12 kW or 15 kW for 3-phase).
- **Main Switch Board wiring**
    - AC Main System Circuit Breaker. The MSB will require a breaker to be installed to allow the Gecko system to be isolated, for example to work on the MSB.
    - Feed-in Meter/CT (supplied) Required for on-grid systems that are not installed as whole home backup. It is installed in the MSB and connected to the Gecko system via a Cat5/6 cable or similar (not supplied).
      Note: *The information from this meter affects the operation of the Gecko system, make sure both the wires and CT are connected the right way around. The direction of current flow on the CT must point towards Gecko*

- **Solar:**

Example: The 10 kW 1-phase accepts up to 6 arrays where each tracker accepts two strings in parallel with a maximum string voltage of 500 Vdc.

Specification	5 kW 1-Phase Gecko	10 kW 1-Phase Gecko	12 kW 3-Phase Gecko	15 kW 3-Phase Gecko
Number of MPPTs	2	3	2	2
String Configuration	1+1	2+2+2	2+1	2+2
Total arrays accepted	Up to 2	Up to 6	Up to 3	Up to 4
Maximum String Voltage	500 Vdc	500 Vdc	600 Vdc	600 Vdc

__Note:__ The Gecko is not designed to act as the customers MSB as it does not include space for additional main and customer circuit breakers or RCDs. RCD's must be installed in the MSB as required by AS4777.2:2020.

Additional tasks

- **Adjusting the programming of the Gecko inverter** for the customer's specific requirements. (e.g. adjust the level of grid-feed allowed by the utility or modifying the SMART Port function). Use the inverter touch screen to update these settings.
- **Remote monitoring:** For continuous monitoring, the Gecko needs a reliable internet connection. This applies to both on-grid and off-grid Installations. It can either be via mobile or connecting to the home internet. The best solution depends on the location. Generally, the home internet provides a more reliable solution. RedEarth recommends connecting to the home internet during installation either by wiring the Gecko to LAN or accessing the home WiFi. However, if only mobile is possible, an optional cell phone booster can improve signal strength and increase reliability.
    - The Gecko battery system comes with an automatically three-months free remote monitoring via mobile internet. After this initial period, there is a charge to continue remote monitoring via mobile internet.
    - **Note**: When any issues with the system arise, it's invaluable to have a continuous monitoring history for troubleshooting. It's important to owner regularly checks the internet connection by accessing the RedEarth app.
- **Handover to the customer:** this includes demonstrating what circuits are backed up during an electricity outage (by turning off the grid supply) as well as demonstrating how the backup generator works (if one is installed) and confirming that it charges the battery system.

Installation and Customer Handover

The Gecko system is designed to be easy to install. It includes pre-wired connection points and a comprehensive labelling and parts kit to simplify the installation. Technical support is available directly from RedEarth during installation if required.

Steps to Complete your Gecko Installation:

1. Transporting – getting the Gecko to site.
2. Positioning and mounting – the Gecko in its final location
3. Electrical connections – at the Gecko system and the Main Switch Board
4. Understanding turn on/shutdown procedures.
5. Commissioning the system – power up, programming and confirming system operation
6. Activating remote Monitoring and Communications – contact RedEarth to confirm remote operation.
7. Customer Handover – including scanning the QR code and their access to the RedEarth app.

Step 1. Transporting

The Gecko system is usually supplied on one pallet, with the batteries in separate cardboard boxes as shown. It has been factory tested; however, the batteries are subsequently removed from the unit for transportation.

WARNING: Personal Injury
The Gecko is heavy. Use safe lifting practices and standard safety equipment when transporting and installing the Gecko system.

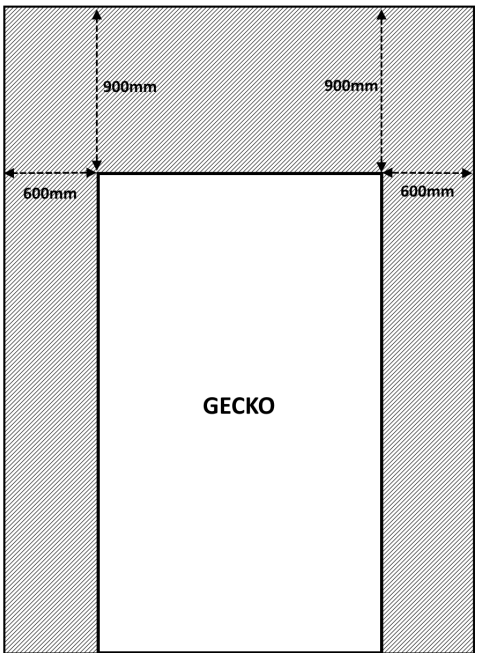
Gecko Size and Weight

- Size: 1950 H x 1060 W x 450 D [mm]
- System Weights (without batteries):
  - The lower battery compartment weighs 35 kg.
  - The upper inverter compartment weights as below.
    - 5 kW 1-phase system weighs 65 kg
    - 10 kW 1-phase system weighs 85 kg
    - 12 kW 3-phase system weighs 90 kg
    - 15 kW 3-phase system weighs 105 kg.
- Troppo ULTRA Lithium batteries (45 kg per battery)
- System weight with 8 Troppo ULTRA batteries 460 kg – 500 kg

Step 2. Positioning & Mounting

Positioning Information

- The Gecko system is designed as a wall and ground supported weatherproof system (IP43) recommended for semi protected outdoor areas (i.e. under an awning or beside a house/shed under an eave etc.).
- The system can be installed indoors. however, proper ventilation must be installed according to AS/NZS 5139.
- The system should be installed in a shaded area and sheltered from direct sunlight (i.e. in a garage, or down the side of a house or shed) to minimise the chance of overheating. If the system temperature goes above 45 °C the power output will start to derate, if the system reaches 60 °C it will shut down. (Once the system cools down, it will restart automatically).
- The system must be installed on a concrete slab.
- The image shows minimum clearance around the system where no windows or doors are allowed, according to AS/NZS 5139. (not to scale).
  The material that the wall is made of (its flammability) can influence the allowed positioning.
- The system must have a minimum of 500 mm clearance in all directions to any grasses, bushes or foliage at all times.
- To minimise cable run length and voltage drop/power loss it should be placed close to the solar panels and the main switchboard.
- Ensure no intake or exhaust vents are blocked to prevent the system to overheat and shutdown. There is a total of six (6) filter elements, four (4) Intakes and two (2) Extraction fans.



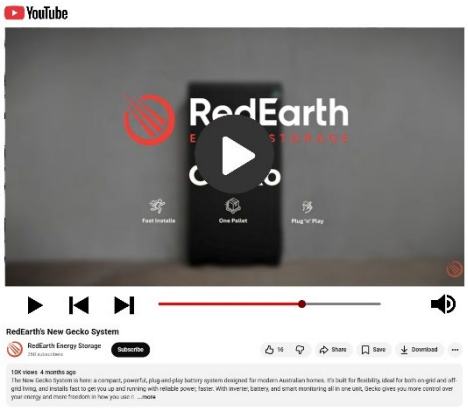
Cooling Airflow

Cooling airflow passes up through intake filters in the base and lower sides of the Gecko system and then out through extraction fans/filters at the top sides of the unit. The fans are controlled by an adjustable temperature switch set to 25^{0}C in the factory.
The filters need regular maintenance (every two months) and replacement (every year). Non-compliance with these maintenance requirements may reduce product performance and compromise safety and may also limit or void warranty coverage.

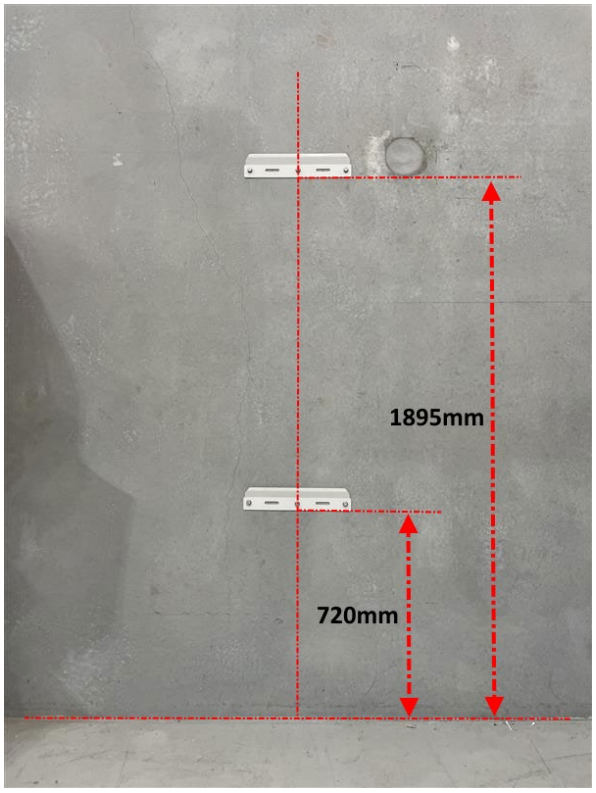
As a part of the customer handover process, show the customer the location of the filters. The User Guide contains an appendix with instructions of the cleaning and replacement procedure.

Installation & Mounting Order

On our website redearth.energy/gecko you will find a video on the Gecko installation. Or access it directly on YouTube here: Gecko assembly video.



- ❑ Install the lower and upper wall mounts using the supplied concrete bolts The centreline of the mounts must be aligned. This centreline will also be the centreline of the entire Gecko system, so ensure the centreline of the mounts are correct for the desired location of the system. Keeping in mind the minimum clearance required according to AS/NZS 5139, and airflow requirements (see Step 2 above)
    - Lower mount - floor to bottom edge of mount is 720 mm
    - Upper mount - floor to bottom edge of mount is 1895 mm



- ❑ Lift the battery compartment over the lower wall mount and ensure the mount has been correctly inserted in the receiving slot.

- ❑ If required, use the supplied levelling shims to ensure an even gap is maintained to the wall behind. When the wall and concrete slab are not perpendicular (90°) to each other, shims on the front or rear feet of the Gecko ensure an even wall gap.

- ❑ Once in position, use the holes in the feet to mark the location for the supplied Dynabolts on the concrete slab.

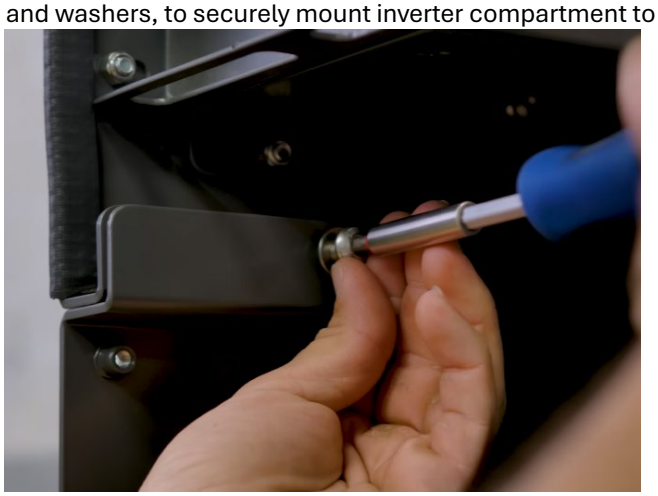
- ❑ Remove the battery compartment and install the Dynabolts.
- ❑ Re-install the battery compartment, ensuring the wall mount is correctly inserted (as per step 2), and has maintained an even gap to the wall behind (using shims if required, as per step 3). Secure the battery compartment to concrete slab using installed Dynabolts.
- ❑ Use silicon sealant to seal around the lower mount and the enclosure slot. This is to ensure any water or insects that can get between the Gecko and the wall behind, cannot enter via the mounting slot. For any possible future warranty issues, RedEarth advice to take a clear photo of this completed.
- ❑ Before installing the inverter compartment ensure the lid is removed and set aside in a safe place. The lid is not to be on the Gecko inverter compartment while being lifted into place.
- ❑ Lift the inverter compartment into place, ensuring the top wall mount is secured into the mounting hook and that the base of the inverter compartment is correctly seated on top of the battery compartment. There are inspection holes in the top mount hook to ensure the wall mount is completely engaged within the mounting hook.

Note: Lifting must only be done from the four (4) provided folding lifting handles. Two on each side of the unit.

WARNING: Personal Injury

The Gecko is heavy. Use safe lifting practices and standard safety equipment when transporting and installing the Gecko system.

❑ Use the supplied 4 x M8 Screws and washers, to securely mount inverter compartment to the battery compartment



Once the above steps are complete the Gecko is ready to be wired to the MSB, PV and Generator/Smart load/AC coupled solar, etc.

Step 3. Electrical Connections

Before any electrical connections are made:

- ensure that all breakers and isolators, as well as those supplying power to the unit, are **turned OFF.**
- check all internal connections in the Gecko are secure and have not come loose during transport.

The Gecko system must be hardwired to a main switchboard, which contains a MEN link and an earth stake.

All cable entry points for the AC, PV solar and any communication cables are made via the entry points on the sides or rear of the system. Use the 25 mm and 32 mm glands that are supplied in the parts kit. These glands are designed to accept flexible 25 mm and 32 mm conduit directly.

Gecko's AC connections and switchgear is located on the right-hand side of the unit. Open the rightside access door and remove the escutcheon panel (4 x M5 screws). This will provide direct access to all the AC switchgear and all the connection points needed for installation.

Gecko's communications device, the RUT, is also located on the right-hand side of the unit. Below the AC escutcheon panel is the comms access panel. It can be accessed by removing the 2 x screws.

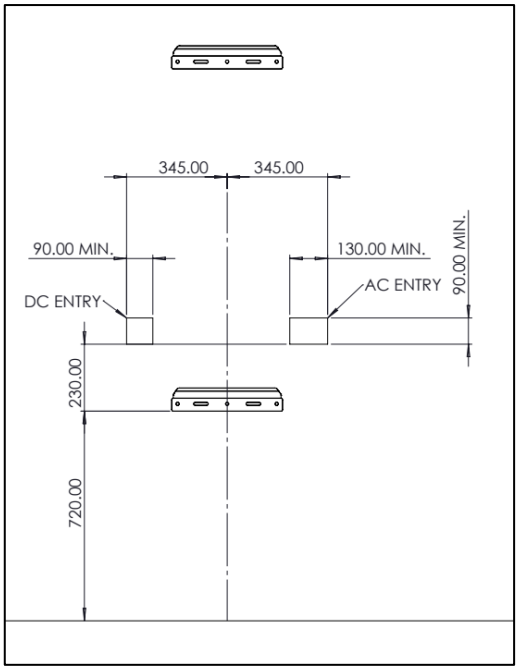
Gecko's DC connections and switchgear is located on the left-hand side of the unit. Open the left side access door and remove the escutcheon panel (6 x M5 screw). This will provide direct access to all the DC switchgear and all the connection points needed for installation.

Rear/Hidden Cable Entry Access Template

When using the rear access gland holes at the back of the Gecko, use the supplied glands (in parts kit) or use sufficient weatherproofing to ensure the IP rating of the unit is not compromised.

The below template shows the location of the rear access gland holes with respect to the lower wall mount.

Note: please confirm with the actual product, as earlier enclosures have a slightly different pattern.



3.1 Battery Connection & Setup

Troppo ULTRA with BMS

The Troppo ULTRA batteries used in the Gecko are controlled by a BMS (Battery Management System). The batteries need electrical, earthing and communication connections.
Follow the procedure below to correctly install the batteries.

Battery Connection

1. **Turn the Isolator off**
   Ensure the BATTERY SYSTEM D.C. ISOLATOR on the left-hand side of the Gecko is turned OFF.

2. **Physical Installation**
   - Take the batteries out of the transport boxes and place them next to the Gecko system.
   - Turn on the BMS displays of all the batteries with the switch on the top of each battery. Confirm that they are all at a similar voltage (within 0.5 V from each other). **Note:** all batteries will show Troppo 1 on the display. When they are fully connected, they will be allocated their battery number.
   - On the battery compartment remove the lower lid (6 x M6 screws) and the support rail (4 x M6 nuts and 2 x M6).
   - Install the Troppo ULTRA batteries evenly left to right. Start by loading the Master battery (number 1 in the picture), in the left, most rear position. Install the other batteries following the physical installation order **1 to 8** to ensure even loading of the Gecko.
   - Reinstall the battery support rail. Secure the batteries to the side and centre rails, using the M6 screws provided in the parts kit. (min. 2 per battery).

Physical installation order

Master 1	2
3	4
5	6
7	8

3. **Earth connections**
   - Connect battery earth link cables on both battery banks (left & right)
   - Connect the batteries in the most rear position (numbered **1 and 2**) to the battery compartment earth stud.
   - Connect the battery compartment earth stud to the inverter compartment earth stud above it. These are clearly indicated with an Earth symbol sticker.

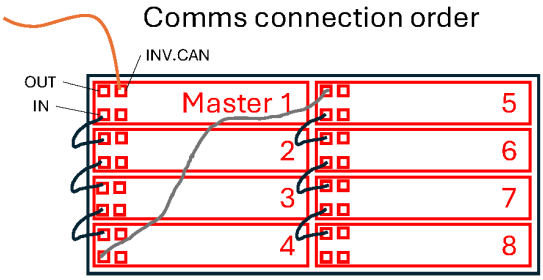
4. Electrical connections

- Plug the battery cables into the batteries, ensuring correct polarity (red to red, black to black). To attach battery cables to the battery terminal, simply push the connector onto the terminal until you hear a click.
  (To remove the battery cables, press the button on the side of the terminal and pull it straight up with a slight wiggle.)
  If the system is not full of batteries, then some of the battery cables will remain unconnected. These are available for connecting additional batteries in the future.

5. Communication connections

Note: The physical installation order differs from the comms connection order. The Master **1** should always be the rear left battery when looking at the unit from the front.

- Connect the pre-wired BMS Comms cable from the inverter into the INV CAN port in the Master battery (Master 1 in the picture).
- Connect the supplied BMS ethernet cables as per the picture of the Comms connection order of an eight (8) batteries installation.



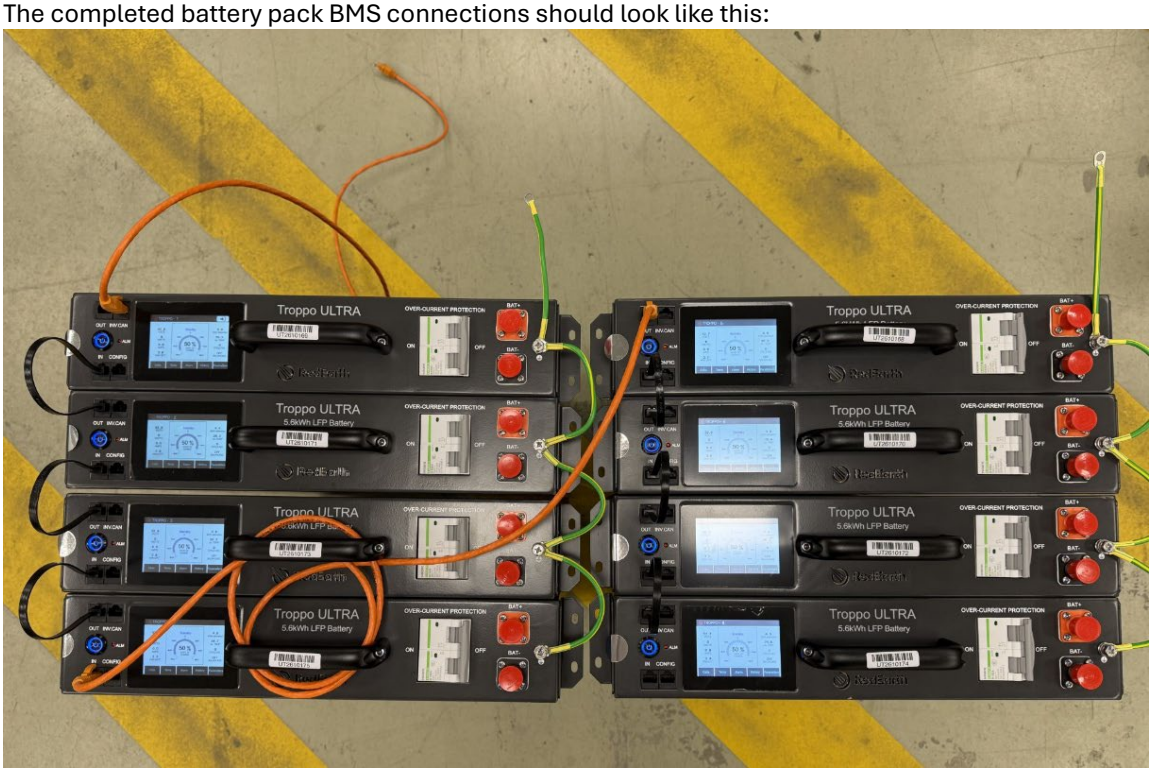
Starting from the **IN** port of Master battery **1** into the **OUT** port of battery **2**. The OUT port of Master Battery 1 stays empty.
After some delay, the display of battery 2 will show Troppo 2. (when the screen has gone black, touch the display to wake it up again)

Continue connecting the **IN** port of battery **2** to the **OUT** port of battery **3** and so on to the **OUT** port of Battery **8**. The IN port of battery **8** stays empty. Check if the displays of the batteries show the correct Troppo number.

The connection between batteries **4** and **5** requires a long communication cable that can be found in the parts box.

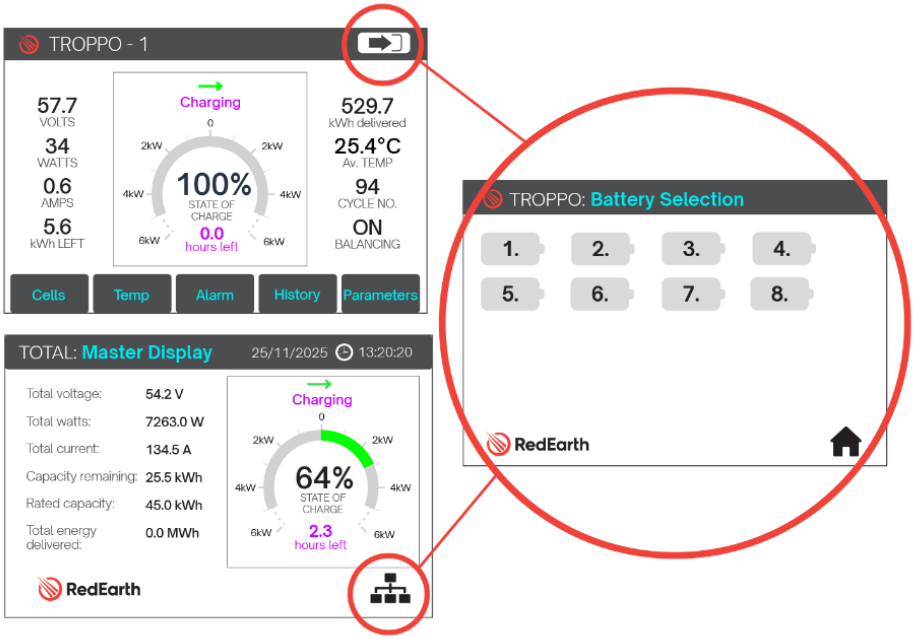
Note: A system with less batteries will be slightly different with its comms connection order. For example, in a six-battery system the long communication cable will be between battery 3 and 4, as there will be only three batteries per bank (left & right).

The completed battery pack BMS connections should look like this:



6. Turning the batteries on

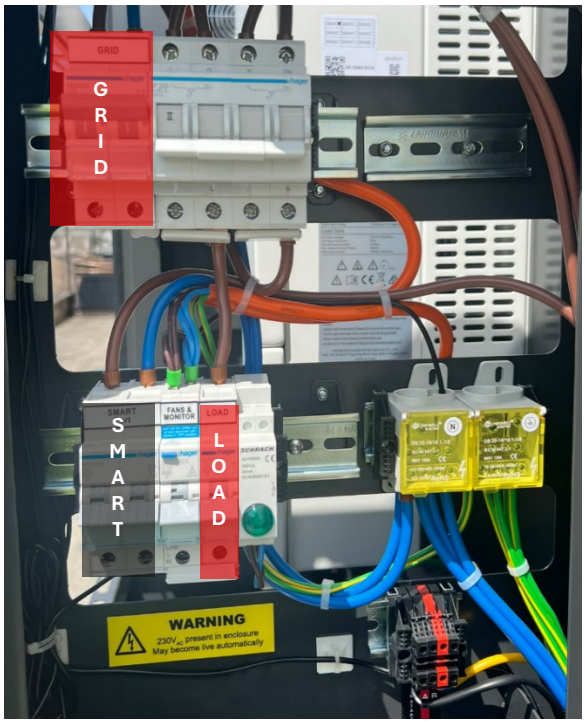
- Turn the OVER CURRENT PROTECTION breakers on top of each battery **ON**.
  You will notice some crossflow of electricity as the batteries balance with each other.
- Ensure the Master battery **1** 'sees' all the Slave batteries, as per below image.
  If the Master battery cannot see all the Slave batteries, or if the batteries are not numbered 1,2,3,....up to 8, check the BMS ethernet cables are securely connected and in the correct order.



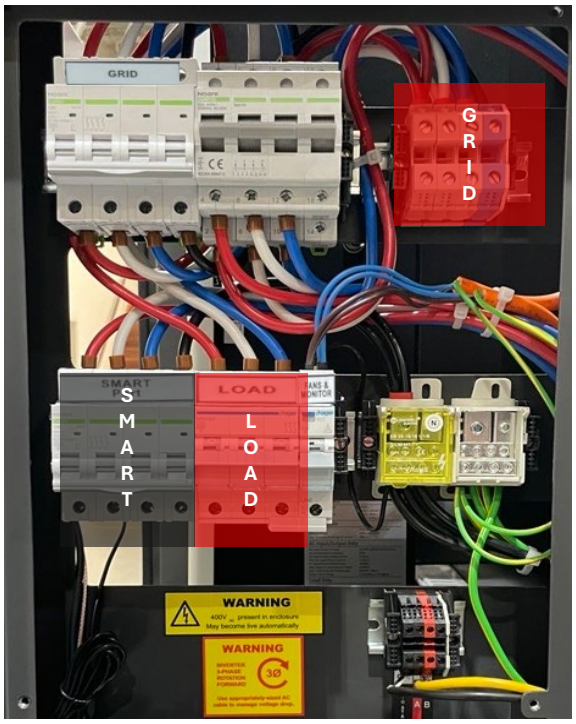
3.2 Grid, Load and Smart Port Connection

Gecko comes pre-wired with AC breakers, for convenient and quick site installation.

1-phase AC



3-phase AC



GRID: The Grid connection from MSB is wired into Screw terminals (3 phase) or breaker (1 phase).
Note: In off-grid Installations, GRID connection is used for the generator feed.

LOAD: The breaker labelled LOAD identifies the connection point that remains live during a black-out. Having loads greater than the inverter capacity, may overload the inverter during blackouts, depending on the power demand. In areas with regular power outages, consider splitting the loads into home load and backed up loads, to avoid overloading the inverter.

SMART Port: The breaker labelled SMART Port has three different options. It can be used to connect either a generator, AC coupled solar or a smart load. See Overview of Installation Tasks for more information on these three options.

To connect the AC cables to the system, pass them through the 25 mm or 32 mm holes in the side or rear of the Gecko using the glands provided. The glands are designed to seal around 25 mm and 32 mm flexible conduit. Secure the ends of the cables into the correct terminal blocks.

The cables for connecting the MSB to the GRID, SMART PORT and LOAD terminals must be sized to support the constant rating of the 5 kW, 10 kW, 12 kW or 15 kW inverter according to AS/NZS 3008.1.1:2017. All cables must be sized to appropriate Australian standards. 40 A or 50 A breakers are installed in the Gecko, depending on the kW rating of the inverter.

3.3 Main SwitchBoard Wiring and Feed-in Meter Installation

3.3.1 Whole Home Backup (requires sufficient inverter size)

Whole home backup does not require the installation of CT/Feed-in meter. The inverter uses it's internal CT to control the grid exports. The inverter should be sized appropriately to cover the maximum load demand.
If the whole home is being backed up by the Gecko (all circuits - generally in an off-grid installation) then there is no need to separate the circuits in the switchboard. Also, the CT built into the Gecko inverter is used and there is no need for an external CT/Feed-in meter to be installed. There is also no need to separate the circuits in the switchboard. Only one step is required.

1. Installation of a double pole MCB breaker (1-phase) or 2 x 3-pole MCBs (3-phase), to isolate the Gecko system if work is being done in the switch board.

3.3.2 Partial Home Backup

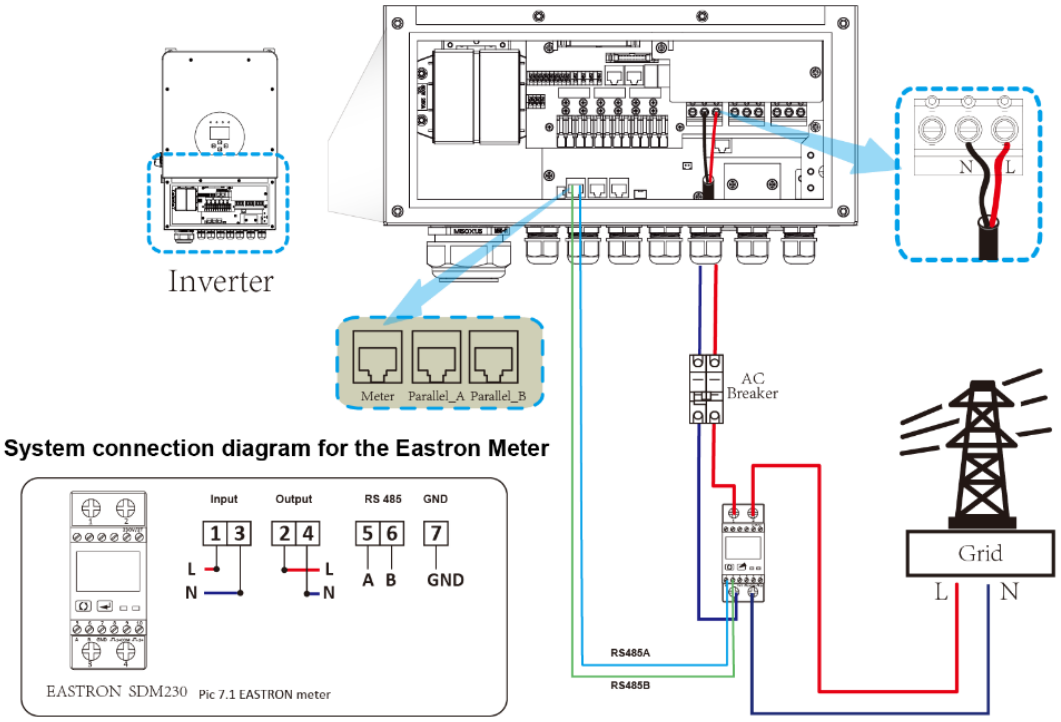
Three tasks must be completed in the switch board for a complete Gecko installation when partial home backup is implemented:
Note: Refer to the SLD diagrams in Appendix B for additional information.

1. Separation of the circuits in the main switchboard into
    - Backedup load - Load circuits that are backed up during an outage
    - Home load - Loads that are unsupported during an outage (e.g. pool heating, electric floor heating etc)
2. Installation of the supplied double pole MCB breaker (1-phase) or 2 x 3-pole MCBs 3-phase), to isolate the Gecko system if work is being done in the switch board.
3. Installation of the supplied Feed-in meter: (Eastron) and CT (1-phase has one CT, 3-phase has 3 CTs) and connection of an associated CAT5/6 cable from the feed-in meter back to the Gecko system (not supplied). The manual for the feed-in meter is included in the parts kit.

The meters supplied in the parts kit are shown below (3-phase and 1-phase meters and CT)

Meter connection: Be sure to wire it into the side that turns off during a grid power outage and have the CTs clipped in between the Electricity Meter and the Main Circuit Breaker (with the ARROW pointing towards the Gecko system - see image).

The communication cable from the feed-in meter to the Gecko system can be made using 2 wires of a CAT5 or CAT6 cable. Connect one strand to the terminal A on the Eastron meter and the second to terminal B. See the image below. Inside the Gecko the terminals that the other end of this CAT cable will connect to are located on the end of the AC DIN rail. Strip the end of strands A and B and connect them to the correct terminals.



System connection diagram for the Eastron Meter

Pic 7.1 EASTRON meter

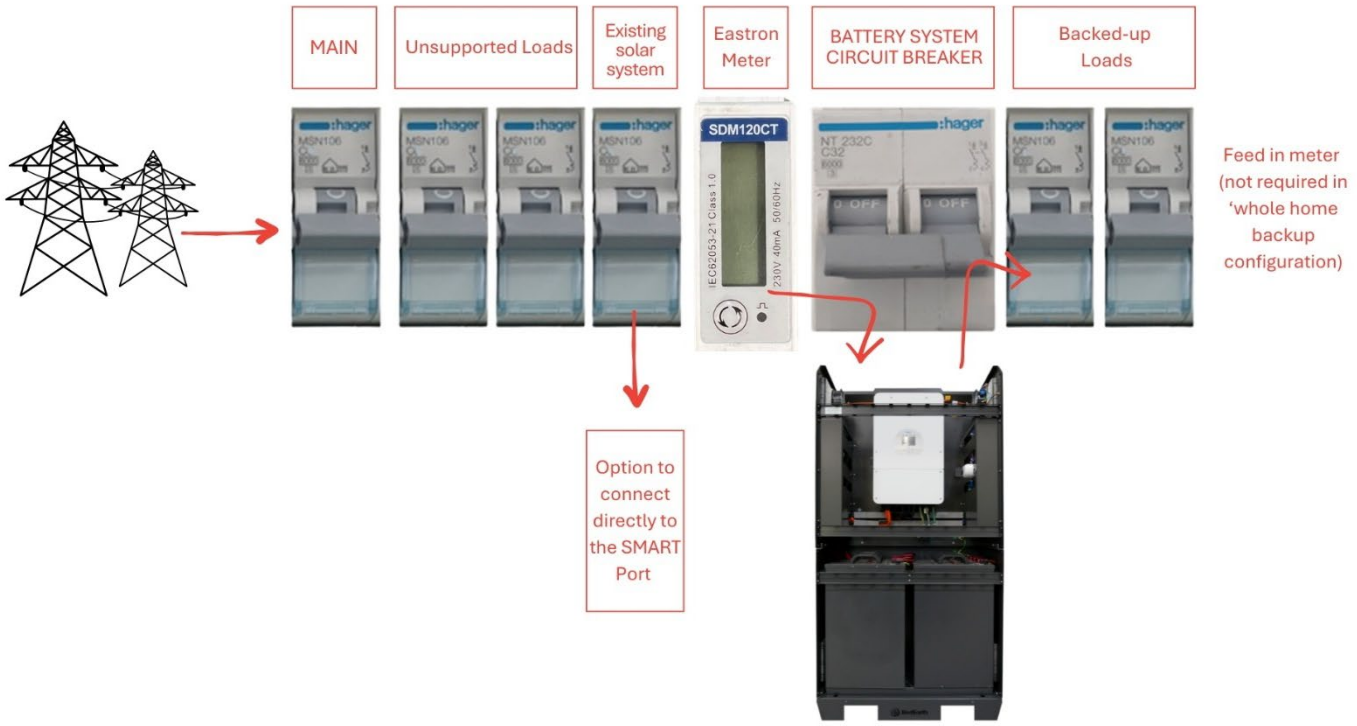
For ease of comprehension, install the Gecko system isolator (MCB) between the unsupported loads and the backed-up loads, as shown below. Then all the backed-up loads can be put on the right-side of the Gecko system isolator.

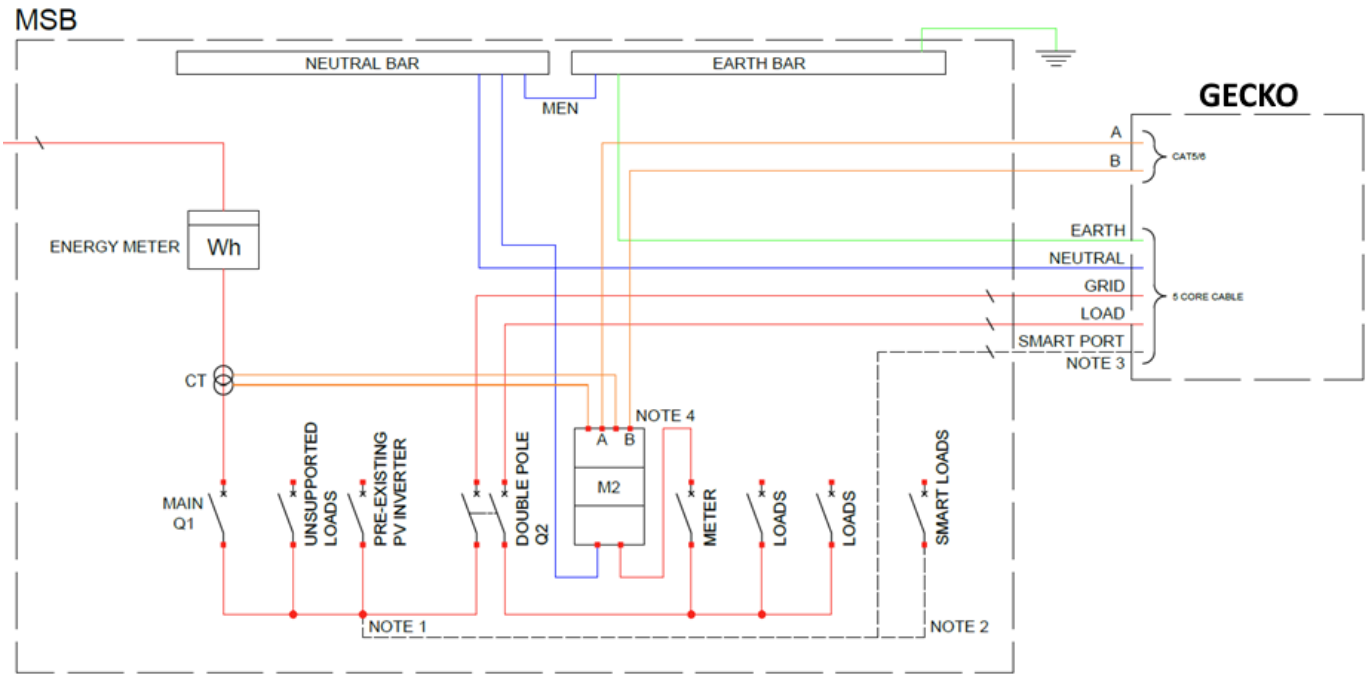
After the installation of the Gecko, the Main Switchboard of the property should look like this (1-phase example shown). The two key components related to the Gecko system are identified below:

- "BATTERY SYSTEM CIRCUIT BREAKER": Isolates the Gecko from the Switchboard, which is required if work is to be done on the Switchboard. At all other times this switch remains on. In the 3-phase installation there are 2 x 3-pole switches required (included in the Parts kit).
- Gecko Feed-in Meter: The CT connected to this meter measures the amount of power exported to or imported from the grid. Note that the CT needs to be connected at the incoming grid connection. If the installation is setup as whole home backup, then the CT is not required as the CT built into the Gecko inverter is used instead. Also, this meter is also not required in an off-grid installation.
- Optional SMART Port MCB - if used, any existing PV Inverter can be connected to the Smart port of the Gecko to allow greater control of its operation and to keep it operational during any grid outage. In this case it needs to be isolated from the unsupported load bus. **Note:** this option is not suitable for all existing PV inverters.

During a blackout the loads connected to the LOAD terminal of the Gecko system will keep functioning. The non-essential loads will turn off until grid power is restored. **Note:** that if too many loads are on the LOAD circuit the battery could run flat quite quickly, or the backup circuit could become overloaded and turn off temporarily.

See next page, for example connection diagrams and SLD's:





3.4 Earth Fault Alarm

Note: *Earth connection must be made to the same switchboard as the power cables.*

Note: *This system complies to IEC 62109-2 clause 13.9 for earth fault monitoring.*

The Earth fault alarm is built into the system. If an earth fault is detected, then a loud audible alarm will sound. The end customer needs to contact the installer to investigate.

3.5 Solar Connection

A Gecko system has two (or three for the 10 kW version) Maximum Power Point Trackers (MPPTs). The PV string configuration is explained in Appendix C - Example of Solar String Voltage Calculations and String Layout

To connect the solar arrays, run the pairs of unterminated PV cables into the 25 mm holes on the DC side or rear of the Gecko (the glands provided in the parts kit are designed to seal around 25 mm flexible conduit). Next check for correct polarity and V_{OC}, then terminate the cables into the appropriate MCB (follow the labelling).

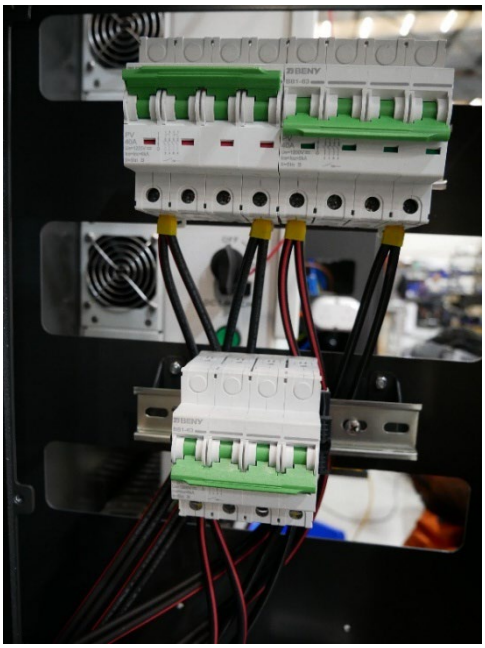
Note: finally ensure that the PV isolator built into the inverter is in the ON position. It is located on the left side of the inverter below the ON/OFF button, as shown here.

PV Isolators

The PV isolation is provided in the Gecko via built-in MCBs. The number of MCBs depends on the size of the Gecko system:

- 5 kW = 2 strings and 2 MCBs
- 10 kW = 6 strings and 3 MCBs
- 12 kW = 3 strings and 2 MCBs
- 15 kW = 4 strings and 2 MCBs

The image shows the 10 kW 1-phase system. The individual PV cables are brought into the DC side or rear of the unit and connected to the MCBs.
Note: It is important to connect PV strings of equal length and orientation when 2 strings are going into one MPPT.



The PV DC isolators are located on the left side of the unit, open the left side access door and remove the escutcheon panel (6 x M5 screw). This will provide direct access to all the DC isolators for PV connections.

Note: *PV modules must have an IEC61730 Class A rating*

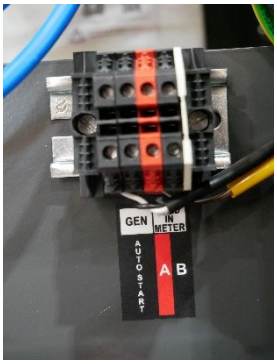
Note: *Ensure that the array is within the inverter specification and that the polarity of the array is correct*

Note: *PV array must be floating (must not be grounded)*

3.6 Connecting the Gecko in an Off-Grid Installation

When connecting the Gecko in an off-grid installation, the same process as above is followed, however there is no grid to connect to or feed-in meter to install.

1. Connect the loads to the LOAD terminal
2. Connect the generator to the GRID port.
3. If the generator is 2-wire auto-start capable, connect the generator with two wires to the terminals inside the cabinet. These are located on the right side of the AC DIN rail.
   The generator will automatically start when the batteries are depleted.
   If the generator is not compatible with 2-wire auto-start it must be manually started and stopped when the batteries are depleted.



Step 4. Turn On/Shutdown Procedure

Before starting up the Gecko ensure the following items are completed:

- ❑ Check the PV solar cables have the correct polarity and are correctly connected to the breakers provided, particularly any parallel strings going into the same MPPT.
- ❑ Check GRID, LOAD and SMART Port cables are securely connected.
- ❑ Check the system is correctly earthed
- ❑ Check a MEN link is in place in the switchboard
- ❑ Check proper weatherproof seals are installed on all cable entry glands of the Gecko.
- ❑ Check the battery terminal connections on the BATTERY SYSTEM D.C. ISOLATOR MCCB are tight. (check they haven't come loose during transportation)
- ❑ Check the WiFi and 4G antenna have been installed using the SMA adapters on the top right side of the unit. (antennas are supplied in the parts kit)

To **Turn ON** the unit for the first time, follow the steps below:

Note: The shutdown procedure can be found on the traffolyte label on the RHS of the unit. The turn on procedure is the reverse of shutdown, which is why the corresponding numbers are in reverse order for turning the system on, 3 to 1.

Switch ON all Over-Current Protection breakers on top of each Troppo ULTRA battery

③ **Switch ON the BATTERY SYSTEM D.C. ISOLATOR**

② **Switch ON all SOLAR D.C. ISOLATORS**

Ensure the PV Solar Isolator on the left side of the Inverter inside the Gecko is ON.

Ensure the on/off button on the left side of the inverter is ON (in)

Ensure the bypass switch is in NORMAL (UP) position as indicated on the label.

① **Switch ON all AC breakers**

Wait for the system to start up

Note that the inverter takes up to 5 minutes to fully start-up when the system is initially powered up. (You may hear several relays clicking during start-up).

The **Shutdown Procedure** is the reverse of the "turn on" procedure and is shown below. This procedure can be found on the traffolyte label on the RHS of the unit.

① **Switch OFF all AC circuit breakers**

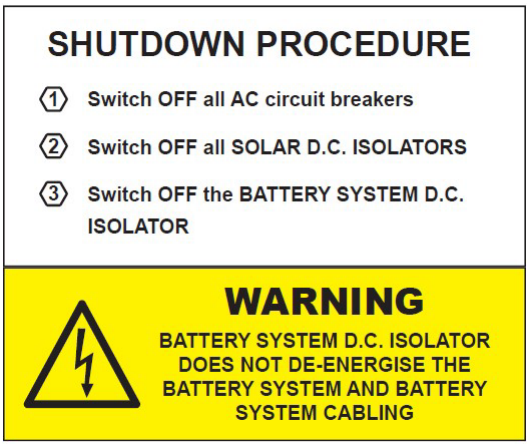
It is not necessary to turn off the inverter via the push button on the left side of the inverter (with the blue light).

② **Switch OFF all SOLAR D.C. ISOLATORS**

It is not necessary to turn off the PV Isolator on the left side of the inverter.

③ **Switch OFF the BATTERY SYSTEM D.C. ISOLATOR**

It Is not necessary to turn off the individual battery breakers on each battery unless the system will be off for over three months.



Step 5. Commissioning the System

The Gecko goes through QA, pre-commissioning checks and testing in RedEarth's factory to confirm correct operation of the system prior to shipment.

To allow connection between the Inverter, the RedEarth RUT comms device and to the internet, the antennas supplied in the parts kits need to be installed. The RUT comms device is pre-installed and wired into the Gecko system, see image.

Screw in the pencil style 4G and Wi-Fi antennas into the SMA adapters on the top right side of the unit. Taking note of the gender of the antenna adapters. The 4G and Wi-Fi have opposite gender SMA connectors so that they cannot be incorrectly installed into the wrong adapter. See image below.

If the 4G signal in the location where the Gecko has been installed is weak or inconsistent, replace the pencil style 4G antenna with the extension 4G antenna (supplied in parts kit). This extension 4G antenna can be placed in a location with a better 4G signal, such as a roof, or an open area without interference

The RedEarth settings can be accessed via the inverter screen.
The installer will need to confirm inverter settings and complete on-site parameter adjustments (e.g., Export limitation, connection to the customer's Wi-Fi or changing the Australia A to B or C setting depending on where the system is being installed in Australia).

This involves the following steps, which are detailed after this list.

1. **Power up the Gecko System.** Note that the inverter takes up to 5 minutes to fully start-up when the system is initially powered up. (You may hear several relays clicking during start-up).
2. **Access the Gecko inverter via the Inverter Screen** to adjust all the settings using the installer login.
3. **Confirm the inverter initial configuration including regional settings** and make any adjustments required.
4. **System Checks & Tests** – including Backup mode (by turning off the main breaker of the house) also test the operation of the By-pass switch.
5. **Fault codes table**. If any faults occur, look up the code in the appendix and correct any faults.

Commissioning steps details are explained below.

5.1 Power up the Gecko System

Follow the procedure outlined in Step 4 Turn ON/Shutdown procedure.

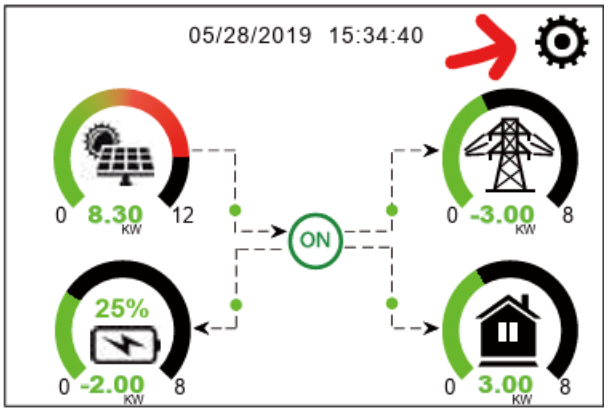
5.2 Access the Inverter via the Inverter Screen

The Gecko has been commissioned and tested in RedEarth's factory.
Only minor parameter adjustments may be required.

These changes can be made via the Gecko's inverter screen directly.

5.3 Confirm the Inverter Configuration (including regional settings)

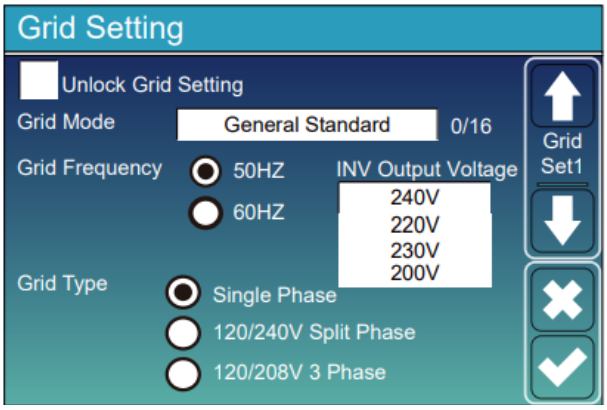
Click the **System Setup** gear icon on the top right to enter the settings.



System Setup -> Grid Setting

Confirm the settings are suitable for the installation site.

Select Australia A, B or C (for grid-connected systems). This will set the power quality response mode and grid protection settings to the default values for Australia Region A, B, C respectively.



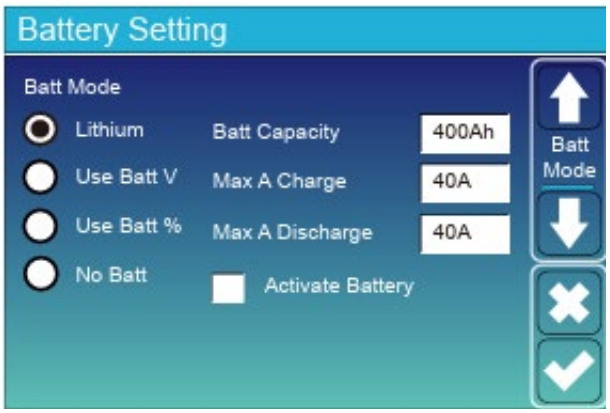
Battery Setting

Select **Lithium** as battery type.

Set **Battery Capacity** to number of Troppo ULTRA batteries x 110 Ah.

Set both **Max A Charge** and **Max A Discharge** to the following:

Batt	5kW	10kW	12kW	15 kW
1	55	55	55	55
2	110	110	110	110
3	120	165	165	165
4	120	220	220	220
5	120	220	240	250
6	120	220	240	250
7	120	220	240	250
8	120	220	240	250



System Work Mode1

Set the following values:

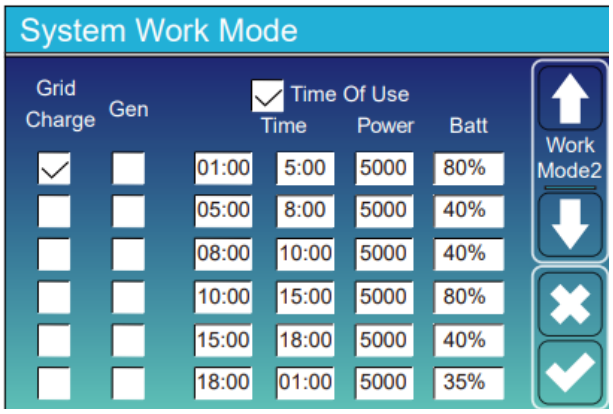
- Set **Max Solar Power** to the inverter's capacity in Watts.
- If there is no meter, select **Zero Export to Load**.
- If there is a meter (Eastron or Chint) or external CTs connected to the inverter, select **Zero Export to CT**.
- Set **Max Sell Power** to the grid export limit allowed for the premise.
- Select **LoadFirst**
- Clear **Grid Peak Shaving**
- Select **Solar Sell**
- Set **Zero-export Power** to 0 (zero)

System Work Mode2

The default settings are:

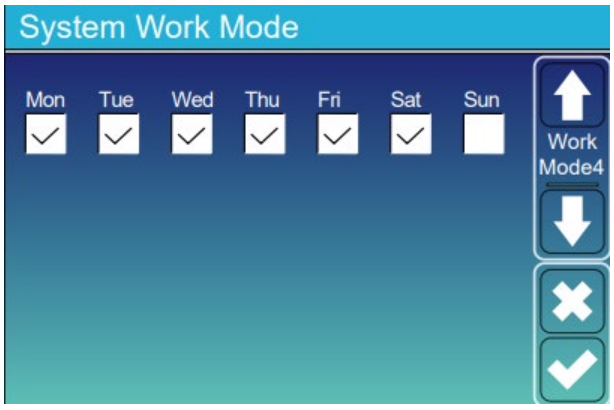
- Select **Time of Use** – this enables all other settings.
- Select **Grid Charge** – indicates to use the grid to charge the battery in this time period (select for all time periods).
- Optionally select **Gen Charge** – indicates the generator to charge the battery in this time period. Used for systems with generators connected in off-grid or hybrid systems (select for all time periods).
- Set **Time** – to set the start & stop time for which these settings are valid.
- Set **Power to** maximum discharge power from the battery allowed in that time period. Usually set to the battery capacity.
- Set **Batt** (V or SOC%) – usually set to 20%. It indicates the level to which the inverter will maintain the battery's voltage or SOC% when charging during the time period.

  E.g The first line in the above example says that in the time period between 1am and 5am, the inverter will keep the batteries at 80% SOC. If the SOC is below 80%, it will charge the batteries from the grid (on top of the solar) at 5000 W.



System Work Mode4

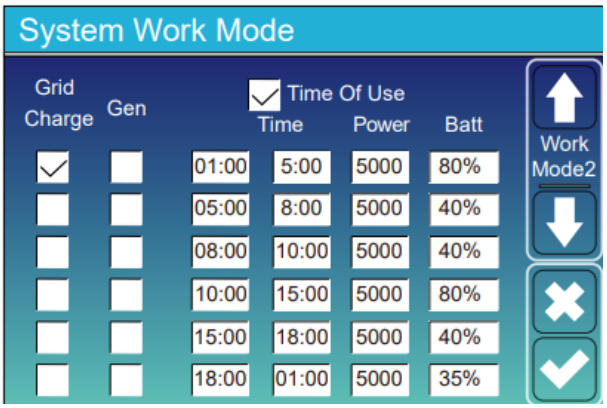
Select **Time of Use** for all days. This indicates the days on which the settings are enabled.

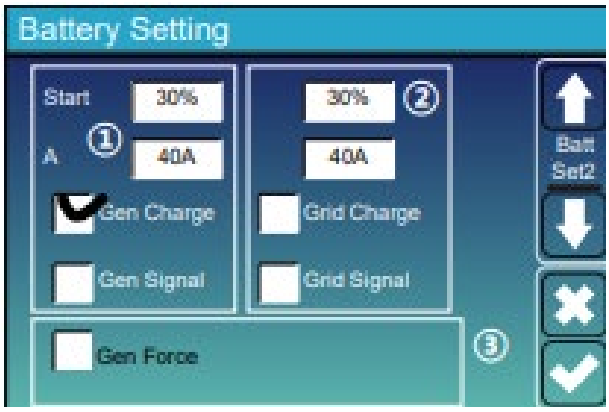


Adjusting Generator Charge Rate
This is usually only required if the Gecko is installed **off-grid.**
To adjust the generator limit you must adjust two parameters:

1.Navigate to **System Work Mode-2** and adjust **Power.** This will adjust how much the generator can be used to feed any loads if the battery is full.

2. Navigate to **System Setup** -> **Battery Setting2**, select **Gen Charge** and adjust A to the Amps in which the generator will be allowed to charge the battery.



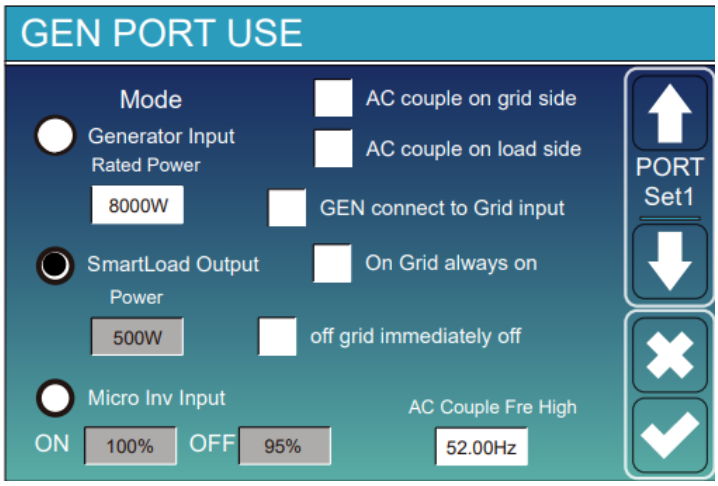


SMART PORT SETUP

The SMART PORT (GEN PORT) can be reconfigured as either a smart load output port or as an AC-coupled solar energy input port.

1. Navigate to **System Setup -> Gen Port Use**

Setting the Smart port to Smart Load Output
For example, to connect an air-conditioner
To convert the generator port to a smart load output (disabling generator functionality), select **SmartLoad Output**



For the Smart Load Output, there are several simple parameters to tune it to the customers' requirements:

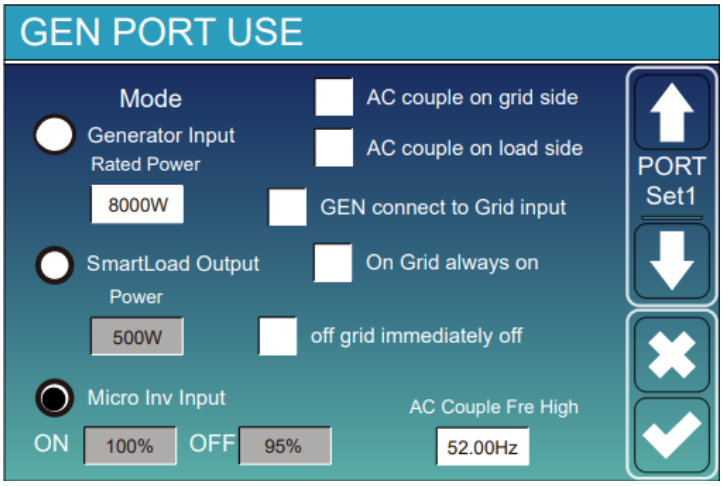
Smart Load OFF Batt:
This is the Battery SOC at which the Smart load switches off. (e.g. air-conditioner turns off)

Smart Load ON Batt:
This is the Battery SOC at which the Smart load switches on simultaneously, turning on the load. (e.g. air-conditioner turns on)

On Grid always on:
Select **on Grid always on** to activate the smart load when the grid is present.

For example, in the image above, Power = 500 W, ON:100%, OFF:95%, indicates that when the PV Power exceeds 500 W and battery bank SOC reaches 100%, the Smart Load Port will switch on automatically and power the load connected. When the battery bank SOC < 95% or PV power falls below 500 W, the Smart Load Power will automatically switch off. The system does not need the grid to be present to supply the smart load with power.

Setting the smart port to AC-coupled renewable input port
To connect an extra or existing PV solar inverter
To convert the generator port (SMART Port) to a smart load output (disabling generator functionality), select **Micro Inv Input**.



There are some simple parameters to tune the AC-coupled renewables input port to your customer's requirements:

Micro Inv Input OFF:
Microinverter or grid-tied inverter shuts down when battery SOC exceeds this set value.

Micro Inv Input ON:
Microinverter or grid-tied inverter starts working when battery SOC is lower than this set value.

AC Couple Fre High:
If **Micro Inv input** is selected, microinverter output power decreases linearly as battery SOC approaches this set value (OFF).
When battery SOC equals the set value (OFF), system frequency becomes the set value (AC couple Fre high), and the Microinverter stops working.
Stops exporting power produced by the microinverter to the grid.

***NOTE**: Changes to the Gecko settings must be done by a trained/qualified person. If in doubt, contact RedEarth Support*

5.4 System Checks & Tests

It is important the operation of the complete system is checked prior to handover to the customer. This includes:

- confirming that the Gecko is generating PV, charging the batteries, and supplying the loads.
- confirming that the Bypass switch works, by physically switching to Bypass mode and confirming the operation.
- confirming that the Backup function works as expected (for on-grid applications). This means that you MUST turn off the main house breaker and confirm the correct circuits are operating in Backup mode. (e.g., fridge & home Wi-Fi)

5.4.1 Normal Operation

In this operation mode the Gecko will use solar, battery and grid, depending on the situation.
All the breakers and isolators should be in the ON position, and the Bypass switch should be in the up position(I).

5.4.2 Bypass Operation

In the By-pass operation mode, the system will completely bypass the inverter and battery, and the grid will provide power directly to the LOAD.
For this to occur, all breakers and isolators should be turned OFF and then the Bypass Switch should be switched into the downwards position (II).

Note: *The breaker in the switchboard (labelled "BATTERY SYSTEM CIRCUIT BREAKER") must always remain tuned on during normal and Bypass operation.*

Note: *With the BYPASS SWITCH In the middle position, all Backup circuits will lose power. This is not a normal operating position for BYPASS switch*

5.4.3 Fan Control Adjustment

The thermostat is located inside the unit. This automatically starts the fans once the temperature rises above the set-point. This set-point can easily be adjusted with a small screwdriver. It is set to 25^0 Celsius in the factory. The fan operation can be tested by turning down the blue dial with a small screwdriver until the fans start. Return the setting to 25^0 Celsius after the test.

Step 6. Activating Remote Monitoring and Communications

For continuous monitoring, the Gecko needs a reliable internet connection. This applies to both on-grid and off-grid Installations. It can either be via mobile or connecting to the home internet. The best solution depends on the location. Generally, the home internet provides a more reliable solution. RedEarth recommends connecting to the home internet during installation either by wiring the Gecko to LAN or accessing the home WiFi.
However, if only mobile is possible, an optional cell phone booster can improve signal strength and increase reliability.

- The Gecko battery system comes with an automatically three-months free remote monitoring via mobile internet. After this initial period, there is a charge to continue remote monitoring via mobile internet.
- **Note**: When any issues with the system arise, it's invaluable to have a continuous monitoring history for troubleshooting. It's important to owner regularly checks the internet connection by accessing the RedEarth app.

Note: All options require the customer to first scan the QR code on the outside of the Gecko system and register their system for monitoring and warranty submission purposes.

The RUT with 4G option requires positioning the Gecko in a good 4G reception area. If installing in a closed area like a shed, remember to check the 4G signal with the shed doors closed as this will affect the strength of the signal. If needed replace the screw in pencil style 4G antenna with the supplied extension 4G antenna. This will allow for more flexible antenna locations. As shown in **"Step 5. Commissioning the system"**

Remote monitoring and control are available via RedEarth's app once the customer completes registration by scanning the QR code and filling in their details. This also registers their warranty.

Step 7. Checklist for the customer and the installer.

Gecko Customer Handover Checklist

RedEarth ENERGY STORAGE

Your installer will go through the following steps to handover your Gecko system:

Installer's contact details:

☐ Provide the documentation that comes with the Gecko

- Gecko Installation Manual
- Gecko User Guide (this document)
- Gecko Identification Sheet (serial #s etc.)
- SDS Troppo ULTRA Battery (Safety Data Sheet)
  This SDS must be left in the switchboard for the fire brigade
- Deye Inverter User Manual
- Eastron Feed-in Meter Manual
- Warranty terms

☐ Provide an overview of your Gecko installation

Explain to you the switches on your Gecko and the isolation switches installed in your switchboard.

Your system includes a SMART port that can be configured for three different modes of operation:

☐ As generator input
☐ As input for a 3rd-party solar inverter
☐ As controlled load output

Confirm how your SMART port is configured. See **Overview of your Gecko installation** for more information.

☐ Demonstrate operation including:

On-Grid: Demonstrate what happens during a grid outage by turning off the Main grid breaker to the house and observing the Backup operation. Confirm that the correct circuits continue to operate.
Note: that there may be a short delay before the backup circuits activate after the grid is disconected from the home. See **Backup operation – On-Grid installation**

Off-Grid: Demonstrate the operation of the backup generator.

☐ Demonstrate the operation and effect of the bypass switch

If your Gecko system develops a fault, the Gecko will begin emitting a beeping sound. If this happens, bypass the whole system which isolates the battery from your home. The grid will provide power directly to all house loads, including the backup loads. All circuits in your home should continue to operate.
See **Bypass Procedure.**

☐ Show maintenance requirements

To maintain optimal performance and ensure product longevity, all maintenance procedures outlined in the User Manual must be followed directly. *Non-compliance may limit or void your warranty coverage.*

☐ Register your system with RedEarth

1. Scan the QR code sticker attached to your Gecko with your mobile phone.
   It looks like this example, but will be specific to your Gecko
   This will take you to the RedEarth customer portal
2. Click Register
3. Enter your contact information and click REGISTER
4. You can now download the **Gecko Warranty document** or view or change your details
   Note: *If it is not possible to register at the time of installation, you can contact RedEarth Customer Service to complete onboarding later.*

☐ Activate Monitoring using the RedEarth App

Monitoring your system is done via the RedEarth app

1. On the RedEarth customer portal, depending on your phone type, click either Google Play or App Store to download the RedEarth app
2. Open the app and create an account. It's recommended to use the same email as used to register your warranty
3. A confirmation email will be sent. Open it and verify your email address
4. You can now log into your account on your RedEarth app to instantly see your system

☐ Ensure all documentation required for claiming STCs is signed by the customer

Additional Options Available for the Gecko

RedEarth can provide several additional options for the Gecko system. The owner is advised to contact the installer for pricing and assistance with adding or expanding the system.

- Additional Troppo ULTRA batteries - up to a total of eight for the Gecko, adding 5.6 kWh extra per battery.
- Electric vehicle charger, that can be monitored on the RedEarth app (both 1-phase and 3-phase)
- Boomerang V2G (Vehicle to Grid) charger that can both charge the electric vehicle and discharge to the Gecko (coming soon).
- Cell phone booster to improve 4G connection.
- Starlink satellite internet connection if the location does not allow another reliable internet connection.
- RedEarth's PPP Smart Energy Trading program.

Support

Technical Support – for the Installer

RedEarth's technical support team are available to provide assistance and guidance during installation.

In order to receive onsite technical support, please contact our team **prior to the installation date** to ensure availability. Direct communication with us is possible from Monday to Friday, between **9am and 5pm across Australia.** Just call 1800 733 637.

Post installation, the customer will be directed to the installer as the first point of call, as per support process for the customer below.
When RedEarth's assistance is required for post installation issues, the quickest way to reach support is to go to our website http://www.redearth.energy and click on *Raise a Ticket*.
Please add the System ID and Installers details to the ticket for expedited assistance.

Customer Support - for the Owner

At RedEarth, we stand by the quality of our products. Supported by our dedicated Australian service team, we're committed to making sure your system delivers reliable performance – and that you always feel supported.

If you encounter any problem with your system, please follow the steps below:

1. **Contact your certified installer or authorised reseller**
   Your first point of call should be your installer or authorised reseller. They will know all the details of your specific installation and will be in the best position to offer you help.
2. **Contact RedEarth**
   If Step 1 is not available, contact RedEarth Customer Support. The quickest way to reach them is to go to our website http://www.redearth.energy and click on *Raise a Ticket*.
   Please add your System ID and Installers details to the ticket for expedited assistance.
3. **Next steps**
   Our Customer Support will contact you soon after with next steps and advice.

Appendices

Appendix A - Technical Specifications Gecko

	Single phase		Three phase	
Gecko Model	**Gecko 5 kW** 2GC1-DY5-XUL	**Gecko 10 kW** 2GC1-DY10-XUL	**Gecko 12 kW** 2GC3-DY12-XUL	**Gecko 15 kW** 2GC3-DY15-XUL *~ Coming soon*
Battery capacity (Troppo ULTRA 5.6 kWh)	2 to 8	2 to 8	3 to 8	3 to 8
Battery capacity (kWh nominal)	11.2 – 44.8 kWh	11.2 – 44.8 kWh	16.8 – 44.8 kWh	16.8 – 44.8 kWh
Inverter model	5K-SG04LP1-AU	10K-SG02LP1-AU	12K-SG04LP3-AU	*~Coming soon*

Battery data

Battery type	Troppo ULTRA 5156 LFP self-managed lithium			
Battery capacity (nominal)	5.6 kWh per Troppo ULTRA battery			
Battery operating voltage range (V)	40 V - 57.6 V			
Maximum charging current (A)	120 A	220 A	240 A	280 A
Maximum discharging current (A)	120 A	220 A	240 A	280 A

PV string input data

Maximum allowable PV (W)	10,000 W	20,000 W	24,000 W	30,000 W
Maximum usable PV (W)	7,500 W	15,000 W	18,000 W	24,000 W
Maximum PV input voltage (V)	500 V	500 V	600 V	600 V
MPPT range (V)	150 to 425 V	150 to 425 V	200 to 600 V	160 to 600 V
Start-up voltage (V)	125 V	125 V	160 V	160 V
PV input current (A)	13 A + 13 A	26 A + 26 A + 26 A	26 A + 13 A	36 A + 36 A
Maximum PV Isc (A)	19.5 A + 19.5 A	44 A + 44 A + 44 A	39 A + 19.5 A	54 A + 54 A
No. of MPPT trackers	2	3	2	2
No. of strings per MPPT tracker	1 + 1	2 + 2 + 2	2 + 1	2 + 2

AC output data

Rated AC input/output active power (W)	5,000 W	9,999 W	12,000 W	15,000 W
Maximum. AC input/output apparent power (VA)	5,000 VA	9,999 VA	12,000 VA	15,000 VA
Peak power (off-grid)	2 times of rated power, 10 sec			
Rated AC input/output current (A)	21.7 A	43.5 A	17.4 A	21.8 A
Maximum AC input/output current (A)	21.7 A	43.5 A	17.4 A	21.8 A
Maximum continuous AC passthrough (A)	35 A	50 A	45 A	50 A
Generator Total Harmonic Distortion (THDi)	< 3% (of nominal power)			
Power factor	0.8 leading to 0.8 lagging			
Output frequency and voltage	50 Hz; 230 V / 400 V, 240 V / 415 V			

	Single phase		Three phase	
Protection	**Gecko 5kW** 2GC1-DY5-XUL	**Gecko 10kW** 2GC1-DY10-XUL	**Gecko 12kW** 2GC3-DY12-XUL	**Gecko 15kW** 2GC3-DY15-XUL *~ Coming soon*
Integrated	DC Reverse Polarity Protection, AC Output Overcurrent Protection, Thermal Protection, AC Output Overvoltage Protection, AC Output Short Circuit Protection, DC Component Monitoring, Insulation Impedance Detection, Arc Fault Circuit Interrupter (optional), DC Switch, Anti-islanding Protection (Active Frequency shift), Residual Current Detection			
Over voltage category	DC Type II / AC Type II			

Certifications and standards

Grid regulation	AS/NZS 4777.2
EMC / safety regulation	IEC/EN 61000-6-1/2/3/4, IEC/EN 62109-1, IEC/EN 62109-2

General data

Operating temperature range (°C)	-40~60°C, >45°C derating			
Cooling	Smart cooling with temperature-controlled fans			
Weight of Gecko system (excl. batteries) (kg)	100 kg	120 kg	125 kg	140 kg
Size of Gecko system (mm)	1060 W x 1950 H x 450 D			
Protection degree of Gecko system	IP43			
RedEarth Warranty	10 years (AU & NZ and South Pacific region)			
Electrical connections	Grid connection, Backup circuits connection, Smart Port connection (AC coupled inverter/smart load/generator), PV array			
Monitoring	Monitoring hardware included and activated via RedEarth's app (subject to network availability).			
Energy trading	On-grid only			
EV charging	Yes			

* The Gecko system is designed to only use the RedEarth Troppo ULTRA -5156 lithium-ion battery (LFP).
** The Nominal Energy Capacity depends on the number of Troppo ULTRA-5156 batteries installed in the Gecko system. The model numbers reflect the total battery capacity installed in the system.

Appendix B - Single Line Diagrams

Power AC & DC, Connection to MSB and Communications (1-phase and 3-phase versions)

See PDFs on following pages.

Drawing Table - Gecko			
Drawing No	Drawing Title	Revision	Revision Notes
300	Gecko - Single Phase - 5, 10 kW Overall Schematic	R4	DC Cable Length
301	Gecko - Single Phase - DC Isolation Arrangements	R4	DC Cable Length
302	Gecko - 3 Phase - 12, 15 kW Overall Schematic	R4	DC Cable Length
303	Gecko - 3 Phase - DC Isolation Arrangements	R4	DC Cable Length
304	Gecko - AC MSB Schematic	R4	DC Cable Length

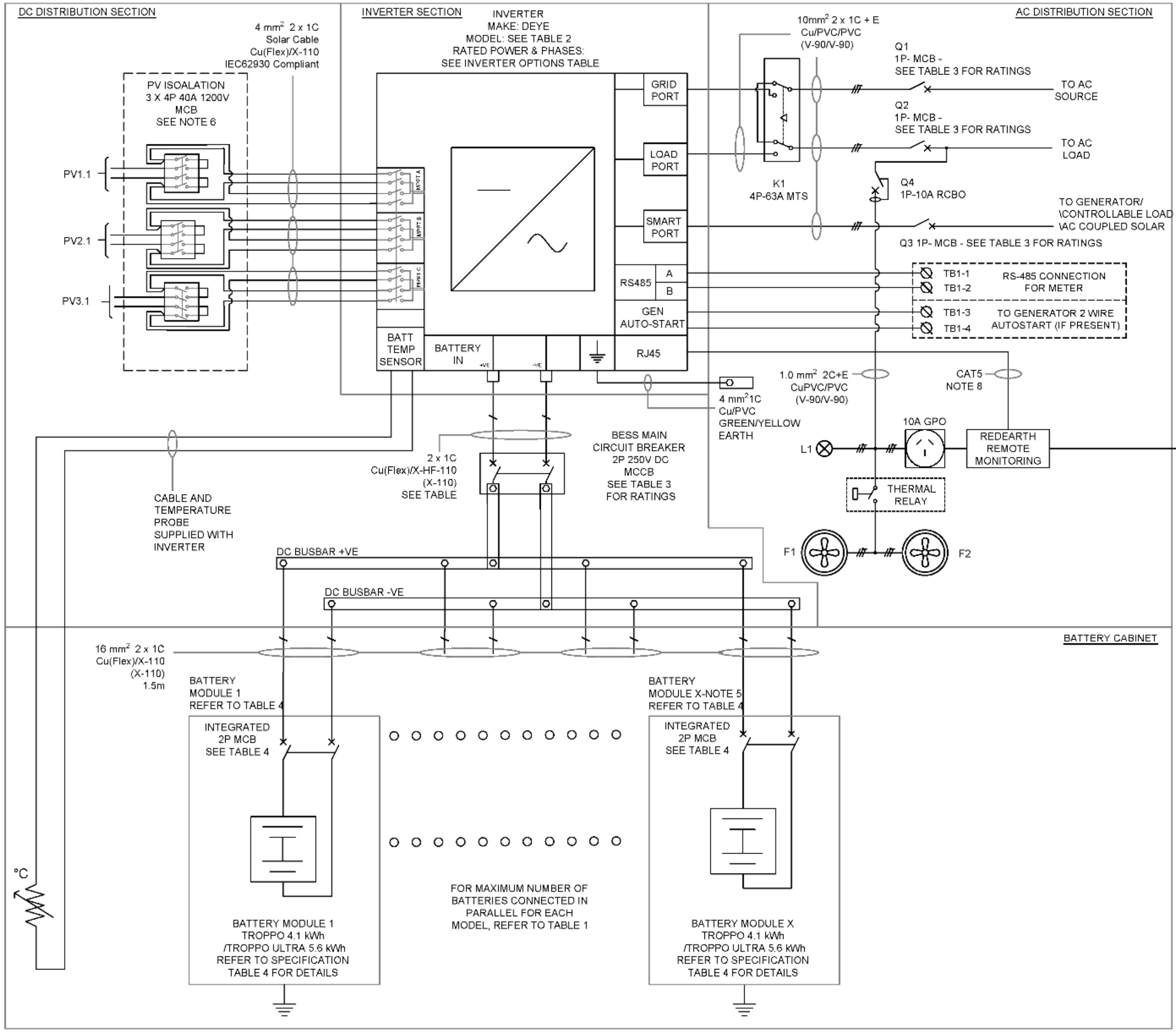


TABLE 1 - BATTERY BANK SIZING OPTIONS (kWh)

NO MODULES	TROPPO 4841	TROPPO ULTRA
2	8.2	11.2
3	12.3	16.8
4	16.4	22.4
5	20.5	28
6	24.6	33.6
7	28.7	39.2
8	32.8	44.8

TABLE 2 - APPLIES TO INVERTER MODELS

MODEL	OUTPUT POWER	NO PHASES
SUN-5K-SG04LP1-AU	5 kVA	1
SUN-10K-SG02LP1-AU-AM3	10 kVA	1

TABLE 3 - SWITCHGEAR SPECIFICATIONS

		Q1	Q2	Q3	K1	Q4	PV-ISO (1-4)	BESS CB
	DESCRIPTION	GRID PORT	LOAD PORT	SMART PORT	BYPASS SWITCH	FAN AND GPO	PV INPUT	BATTERY CB
	TYPE	1P AC MCB	1P AC MCB	1P AC MCB	MTS	1P RCBO T/A	4P MCB	2P MCCB
RATED CURRENT	SUN-5K-SG04LP1-AU	40	40	40	63	10	40	160/180*
	SUN-10K-SG02LP1-AU-AM3	50	50	50	63	10	40	250

*5 kVA INVERTER MODEL HAS 2 X BESS CB OPTIONS 128/160 (Ir=0.8) OR 126/180 (Ir=0.7).

TABLE 4 - BATTERY MODULE SPECIFICATIONS

	Troppo 4841	Troppo ULTRA
MANUFACTURER	RedEarth	RedEarth
MODEL	TROPPO 4841	TROPPO ULTRA
CHEMISTRY	LIPO4	LIPO4
NOMINAL VOLTAGE	51.2 VDC	51.2VDC
NOMINAL ENERGY	4.1 kWh KWH	5.6 kWh
Ah CAPACITY	79.8 Ah	110 A
INTEGRATED MCB	63 A	100 A

TABLE 5- CABLE SPECIFICATIONS

CABLE	SPACIFICATION	SIZE(mm^2)	SPEC	INSTALLATION METHOD	CURRENT CAPACITY (A)
GRID PORT SUBMAIN	2 x 1C+E	10	Cu(Flex)/PVC	ENCLOSED	54
LOAD PORT SUBMAIN	2 x 1C+E	10	Cu(Flex)/PVC	ENCLOSED	54
SMART PORT SUBMAIN	2 x 1C+E	10	Cu(Flex)/PVC	ENCLOSED	54
MAIN BATTERY SUBMAIN	2 x 1C	70/25*	Cu(Flex)/X-110	UNENCLOSED	273/139*
BATTERY MODULE SUBMAIN	2 x 1C	16	Cu(Flex)/X-110	UNENCLOSED	105
PV CABLES	2 x 1C	4	Cu(Flex)/X-110	UNENCLOSED	45
EARTH	1C	4	Cu/PVC	UNENCLOSED	N/A

*5 kVA INVERTER MODEL USES 25MM² CABLE, 8 KVA & 10 KVA MODELS USE 70MM²

TABLE 6 - INVERTER SPECIFICATIONS

AC SIDE	MANUFACTURER	DEYE	
	MODEL	SUN-5K-SG04LP1-AU	SUN-10K-SG02LP1-AU-AM3
	OUTPUT POWER	5 KVA	10 kVA
PV	NO MPPT's	2	3
	INPUTS PER MPPT	1/1	2/2/2
	MAX INPUT VOLTAGE	500V	
	MAX SHORT CCT CURRENT	19.5A+19.5A	44A+44A+44A
	MAX OPERATING CURRENT	13A+13A	26A+26A+26A
BATTERY INPUT	RATED VOLTAGE	40-60V DC	
	MAX CHARGE CURRENT	120A	220A
	MAX DISCHARGE CURRENT	120A	220A

*SEE NOTE 6

RedEarth ENERGY STORAGE

ABN:34163828920
15 FIENTA PL, DARRA, QLD 4076
Ph 1800 773 637, www.redearth.enegy
This drawing is the property of RedEarth Energy storage and shall not be used for any other products or purpose.

PROJECT NAME: RedEarth Standard Drawings

ADDRESS: N/A N/A

SCALE: NTS

DRAWING TITLE: Gecko Single Phase 5 and 10 kW Overall Schematic

PAGE SIZE: A3

DRAWING NUMBER: P0121-RED-GENE-300-R4

SHEET 1 of 1

NOTES:

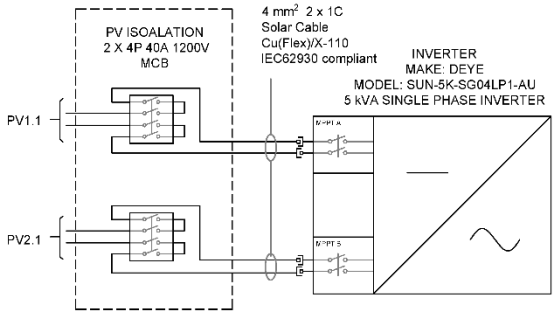
1. All installation works shall comply with: AS/NZS 3000, AS/NZS 3008, AS5033, AS4777, AS5139, CEC Guidelines, Supply Authority Service & Installation Rules and local authority guidelines.
2. PV cables shall comply with IEC62930 as per AS5033.
3. Battery DC Cabling has been sized based on an installation method of "unenclosed touching".
4. PV array installation by customer taking into account internal components of Gecko unit when declaring compliance to AS5033.
5. Replace X With number of batteries.
6. DC isolation arrangement shown is for SUN-10K-SG02LP1-AU-AM3 (10 kVA) . For all inverter isolation arrangements refer to drawing 301 - gecko dc isolation arrangements.
7. Based on maximum pass through current on inverter datasheet and/or sizing of outgoing AC cables
8. Connection from Datalogger in Deye inverter to Redearth RUT may be via ethernet (RJ45) or Wifi depending on the type of datalogger (Wifi/RJ45) supplied by the manufacturer.

REVISION REGISTER:

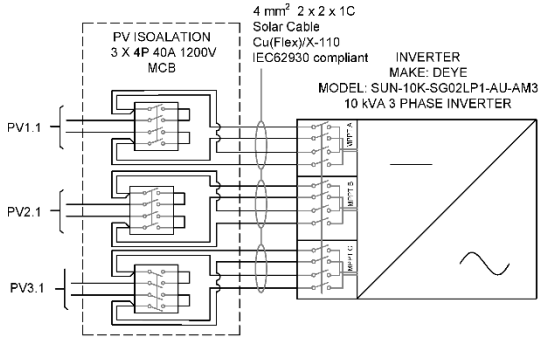
FOR REFERENCE

REV	NOTE	DRWN	CHCKD	DATE
R4	DC Cable Length Updates	RM	EG	27/2/2026
R3	Product Ref Updates	RM	EG	25/2/26
R2	Table References	RM	EG	23/2/26
R1	For Reference	RM	EG	28/10/25

SUN-5K-SG04LP1-AU



SUN-10K-SG02LP1-AU-AM3



* EACH ISOLATOR HAS 2 X SINGLE CORE CABLES FOR POSITIVE AND 2 X SINGLE CORE CABLES FOR NEGATIVE, CONNECTED IN PARALLEL AT THE ISOLATOR TERMINAL.
EACH HARDWIRED INPUT TERMINAL AT THE INVERTER HAS 1 X SINGLE CORE CABLE CONNECTED.

TABLE 1 - DC ISOLATION ARRANGEMENT FOR INVERTER MODELS

INVERTER SPECIFICATIONS				DC ISOLATOR SPECIFICATIONS					
						4P RATING		2P RATING	
MODEL	NO MPPTS	INPUTS PER MPPT	TOTAL PV INPUTS	MAKE	MODEL	VOLTAGE	CURRENT	VOLTAGE	CURRENT
SUN-5K-SG04LP1-AU	2	1+1	2	ZJBENNY	BB1-63	1200V	40A	600V	40A
SUN-10K-SG02LP1-AU-AM3	3	2+2+2	6						

TABLE 2 - INVERTER MODELS

MODEL	OUTPUT POWER	NO PHASES
SUN-5K-SG04LP1-AU	5 kVA	1
SUN-10K-SG02LP1-AU-AM3	10 kVA	1

RedEarth ENERGY STORAGE

ABN:34163828920
15 FIENTA PL, DARRA, QLD 4076
Ph 1800 773 637, www.redearth.enegy

CLIENT:

PROJECT NAME:
RedEarth Standard Drawings

ADDRESS:
N/A
N/A

SCALE:
NTS

DRAWING TITLE:
Gecko - Single Phase
DC Isolation Arrangements

PAGE SIZE:
A3

DRAWING NUMBER:
P0121 -RED-GENE-301 -R4

SHEET
1 of 1

NOTES:

1. All installation works shall comply with; AS/NZS 3000, AS/NZS 3008, AS5033, AS4777, AS5139, CEC Guidelines, Supply Authority Service & Installation Rules and local authority guidelines.
2. PV cables shall comply with IEC62930 as per AS5033.
3. PV Installation by customer taking into account inverter and internal components of Gecko unit when declaring compliance to AS5033.

REVISION REGISTER:

FOR REFERENCE

REV	NOTE	DRWN	CHCKD	DATE
R4	DC Cable length Updates	RM	EG	27/2/2026
R3	Product Ref updates	RM	EG	25/2/26
R2	Table References	RM	EG	23/2/26
R1	For Reference	RM	--	4/11/25

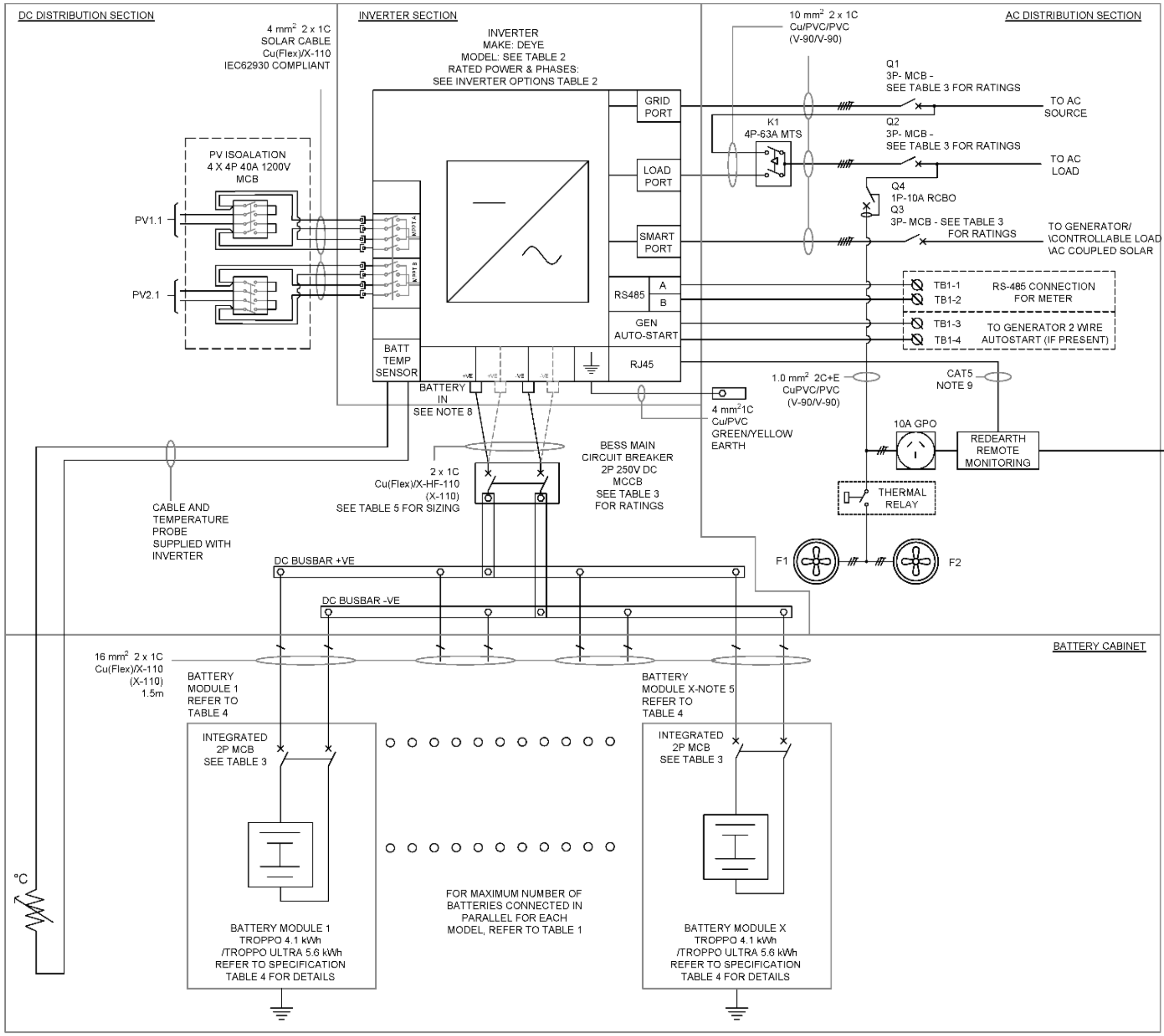


TABLE 1 - BATTERY BANK SIZING OPTIONS (kWh)

NO MODULES	TROPPO 4841	TROPPO ULTRA
3	12.3	16.8
4	16.4	22.4
5	20.5	28
6	24.6	33.6
7	28.7	39.2
8	32.8	44.8

TABLE 2 - INVERTER MODELS

MODEL	OUTPUT POWER	NO PHASES
SUN-12KSG04LP3-AU	12 kVA	3
SUN-15KSG05LP3-AU-SM2	15 kVA	3

TABLE 3 - SWITCHGEAR SPECIFICATIONS

		Q1	Q2	Q3	K1	Q4	PV-ISO (1-4)	BESS CB
	DESCRIPTION	GRID PORT	LOAD PORT	SMART PORT	BYPASS SWITCH	FAN AND GPO	PV INPUT	BATTERY CB
	TYPE	3P AC MCB	3P AC MCB	3P AC MCB	MTS	1P RCBO T/A	4P MCB	2P MCCB
RATED	SUN-12KSG04LP3-AU	50	50	50	63	10	40	250
CURRENT PER INVERTER	SUN-15KSG05LP3-AU-SM2	50	50	50	63	10	40	250

TABLE 4 - BATTERY MODULE SPECIFICATIONS

	Troppo 4841	Troppo ULTRA
MANUFACTURER	RedEarth	RedEarth
MODEL	TROPPO 4841	TROPPO ULTRA
CHEMISTRY	LiPO4	LiPO4
NOMINAL VOLTAGE	51.2 V DC	51.2VDC
NOMINAL ENERGY	4.1 kWh KWH	5.6 kWh
Ah CAPACITY	79.8 Ah	110 A
INTEGRATED MCB	63 A	100 A

TABLE 5 - CABLE SPECIFICATIONS

CABLE	SPACIFICATION	SIZE(mm^2)	SPEC	INSTALLATION METHOD	CURRENT CAPACITY(A)
GRID PORT SUBMAIN	4 x 1C	10	Cu(FLEX)/PVC	UNENCLOSED	54
LOAD PORT SUBMAIN	4 x 1C	10	Cu(FLEX)/PVC	UNENCLOSED	54
SMART PORT SUBMAIN	4 x 1C	10	Cu(FLEX)/PVC	UNENCLOSED	54
MAIN BATTERY MCCB-INVERTER	2 x 1C/2 X 2 X 1C*	70/25*	Cu(Flex)/X-110	UNENCLOSED	273/278*
BATTERY MODULE SUBMAIN	2 x 1C	16	Cu(Flex)/X-110	UNENCLOSED	105
PV CABLES	2 x 1C	4	Cu(Flex)/X-110	UNENCLOSED	45
EARTH	1C	4	Cu/PVC	UNENCLOSED	N/A

*12 kVA INVERTER MODEL USES 70MM² CABLE, 15kVA UNIT USES 2 X 25 MM² (1 CABLE PER BATTERY INPUT)

TABLE 6 - INVERTER SPECIFICATIONS

AC SIDE	MANUFACTURER	DEYE	
	MODEL	SUN-12K-SG04LP3-AU	SUN-15K-SG05LP3-AU-SM2
	OUTPUT POWER	12 KVA	15 kVA
PV	NO MPPT's	2	2
	INPUTS PER MPPT	2/1	2/2
	MAX INPUT VOLTAGE	600V**	
	MAX SHORT CCT CURRENT	39A+19.5A	54A+54A
	MAX OPERATING CURRENT	26A+13A	36A+36A
BATTERY INPUT	NO. INPUTS	1	2
	RATED VOLTAGE	40-60V DC	
	MAX CHARGE CURRENT	240A	250/280A*
	MAX DISCHARGE CURRENT	240A	250/280A*

*CONFIGURE SOFTWARE TO LIMIT MAXIMUM CHARGING CURRENT TO 250A

** LIMITED BY DC CIRCUIT BREAKER VOLTAGE RATING UNDER PV EARTH FAULT CONDITIONS SEE AS5033 CL4.3.4.2.5

RedEarth ENERGY STORAGE

ABN:34163828920
15 FIENTA PL, DARRA, QLD 4076
Ph 1800 773 637, www.redearth.enegy

PROJECT NAME:
RedEarth Standard Drawings

ADDRESS:
N/A
N/A

SCALE:
NTS

DRAWING TITLE:
Gecko - 3 Phase 12,15
Overall Schematic

PAGE SIZE:
A3

DRAWING NUMBER:
P0121-RED-GENE-302-R4

SHEET
1 of 1

NOTES:

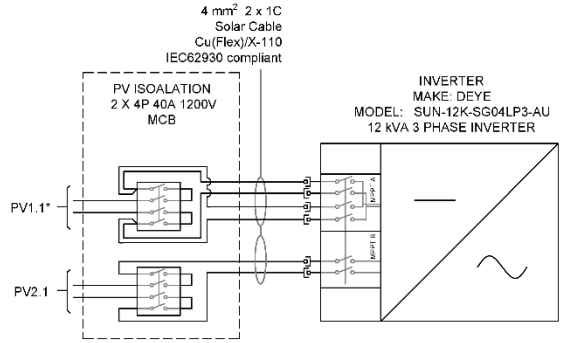
1. All installation works shall comply with; AS/NZS 3000, AS/NZS 3008, AS5033, AS4777, AS5139, CEC Guidelines, Supply Authority Service & Installation Rules and local authority guidelines.
2. PV cables shall comply with IEC62930 as per AS5033.
3. Battery DC Cabling has been sized based on an installation method of "unenclosed touching".
4. PV array installation by customer taking into account internal components of Gecko unit when declaring compliance to AS5033.
5. Replace X With number of battery modules.
6. DC isolation arrangement shown is for SUN-15K-SG05LP3-AU-SM2 (15 kVA) . For all inverter isolation arrangements refer to drawing 303 - gecko dc isolation arrangements.
7. Based on maximum pass through current on inverter datasheet and/or sizing of outgoing AC cables
8. Second Battery input present on 15 kVA inverter model only. Parallel connection at circuit breaker and 1 single core cable per terminal at inverter.
9. Connection from Datalogger in Deye inverter to Redearth RUT may be via ethernet (RJ45) or Wifi depending on the type of datalogger (Wifi/RJ45) supplied by the manufacturer.

REVISION REGISTER:

FOR REFERENCE

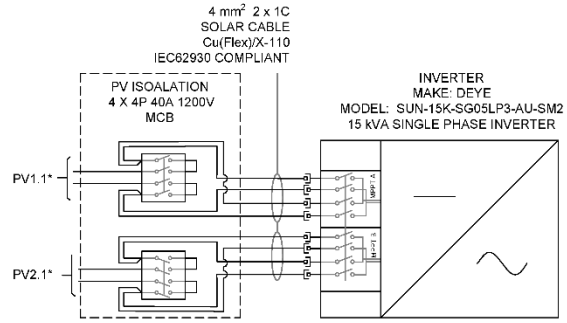
REV	NOTE	DRWN	CHCKD	DATE
R4	DC Cable Length Updates	RM	EG	27/2/2026
R3	Product Ref Updates	RM	EG	25/2/26
R2	Table references	RM	EG	23/2/26
R1	For Reference	RM	EG	28/10/25

SUN-12K-SG04LP3-AU



* EACH ISOLATOR HAS 2 X SINGLE CORE CABLES FOR POSITIVE AND 2 X SINGLE CORE CABLES FOR NEGATIVE, CONNECTED IN PARALLEL AT THE ISOLATOR TERMINAL.
EACH HARDWIRED INPUT TERMINAL AT THE INVERTER HAS 1 X SINGLE CORE CABLE CONNECTED.

SUN-15K-SG05LP3-AU-SM2



* EACH ISOLATOR HAS 2 X SINGLE CORE CABLES FOR POSITIVE AND 2 X SINGLE CORE CABLES FOR NEGATIVE, CONNECTED IN PARALLEL AT THE ISOLATOR TERMINAL.
EACH HARDWIRED INPUT TERMINAL AT THE INVERTER HAS 1 X SINGLE CORE CABLE CONNECTED.

TABLE 1 - DC ISOLATION ARRANGEMENT FOR INVERTER MODELS

INVERTER SPECIFICATIONS				DC ISOLATOR SPECIFICATIONS					
						4P RATING		2P RATING	
MODEL	NO MPPTS	INPUTS PER MPPT	TOTAL PV INPUTS	MAKE	MODEL	VOLTAGE	CURRENT	VOLTAGE	CURRENT
SUN-12KSG04LP3-AU	2	2+1	3	ZJ BENY	BB1-63	1200V	40A	600V	40A
SUN-15KSG05LP3-AU-SM2	2	2+2	4						

TABLE 2 - APPLIES TO INVERTER MODELS

MODEL	OUTPUT POWER	NO PHASES
SUN-12KSG04LP3-AU	12 kVA	3
SUN-15KSG05LP3-AU-SM2	15 kVA	3

RedEarth ENERGY STORAGE
ABN:34163828920
15 FIENTA PL, DARRA, QLD 4076
Ph 1800 773 637, www.redearth.enegy

CLIENT:

PROJECT NAME:
RedEarth Standard Drawings

ADDRESS:
N/A
N/A

SCALE:
NTS

DRAWING TITLE:
Gecko - 3 Phase
DC Isolation Arrangements

PAGE SIZE:
A3

DRAWING NUMBER:
P0121 -RED-GENE-303 -R4

SHEET
1 of 1

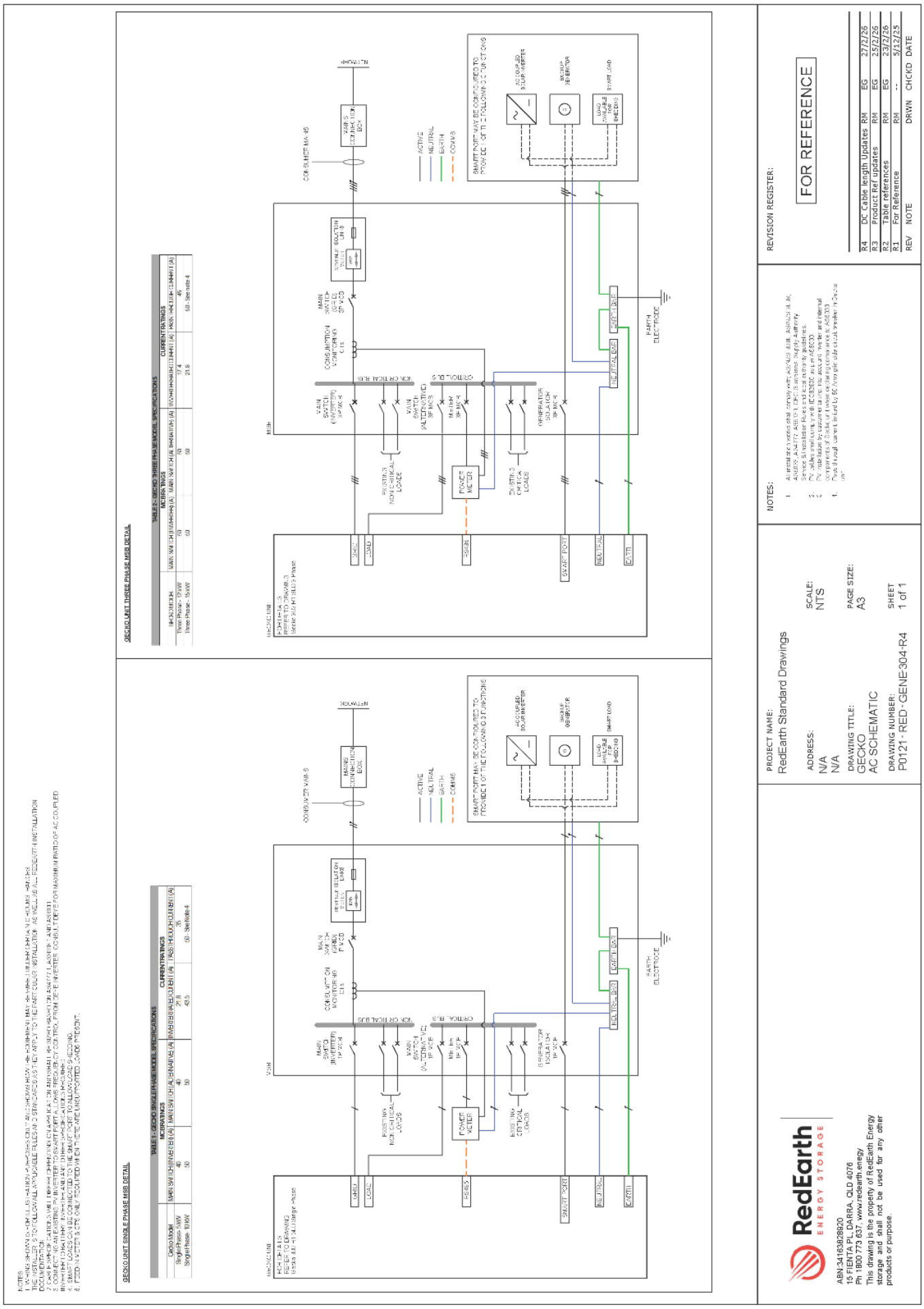
NOTES:

1. All installation works shall comply with; AS/NZS 3000, AS/NZS 3008, AS5033, AS4777, AS5139, CEC Guidelines, Supply Authority Service & Installation Rules and local authority guidelines.
2. PV cables shall comply with IEC62930 as per AS5033.
3. PV Installation by customer taking into account inverter and internal components of Gecko unit when declaring compliance to AS5033.

REVISION REGISTER:

FOR REFERENCE

REV	NOTE	DRWN	CHCKD	DATE
R4	DC Cable Length Updates	RM	EG	27/2/2026
R3	Product Ref updates	RM	EG	26/2/26
R2	Table References	RM	EG	23/2/26
R1	For Reference	RM	--	4/11/25


NOTES
GECKO UNIT SINGLE PHASE MSB DETAIL
GECKO UNIT THREE PHASE MSB DETAIL
TABLE 1 - GECKO SINGLE PHASE MODEL SPECIFICATIONS
TABLE 2 - GECKO THREE PHASE MODEL SPECIFICATIONS
NOTES:
REVISION REGISTER:
FOR REFERENCE
PROJECT NAME:
RedEarth Standard Drawings
ADDRESS:
N/A
N/A
SCALE:
NTS
PAGE SIZE:
A3
DRAWING TITLE:
GECKO
AC SCHEMATIC
DRAWING NUMBER:
P0121-RED-GENE304-R4
SHEET
1 of 1
RedEarth
ENERGY STORAGE
ABN 34163828920
15 FIENTA PL, DARRA, QLD 4076
Ph 1800 773 637, www.redearth.energy
This drawing is the property of RedEarth Energy storage and shall not be used for any other products or purpose.

Appendix C - Example of Solar String Voltage Calculations and String Layout

PV racking and solar panels should be designed and installed in accordance with AS/NZS 5033 and the latest CEC Installation guidelines. Caution should be taken in selecting PV panels and the wiring method to ensure Open Circuit Voltage (V_{OC}) and Short Circuit Current (I_{SC}) ratings are not exceeded.

PV String Voltage

String voltage overview:

Specifications of a typical 400 W Solar panel are listed below.

If the maximum string voltage is 500 V then the maximum number of panels that can be connected in series is nine, in an area where the temperature may drop to 0°C during the day.

This is because the V_{OC} increases from 49.5 V to 52.8 Vdc at 0°C.

This is calculated as follows:

25 (difference from 25°C to lowest expected temp of 0°C) x -0.270%/°C = 6.75% voltage increase from 49.5 V. Therefore, the maximum panel voltage that can be expected = 49.5 x 1.0675 = 52.8 Vdc. So only nine (9) panels can be connected in series to stay under 500 Vdc maximum.

Electrical characteristics 400W panel	Mono-Crystalline Module (HiE-S_____UF)	
Maximum Rating Power (Pm)	W	400
Open Circuit Voltage (VoC)	V	49.5
Short Circuit Current (Isc)	A	10.12
Maximum Power Voltage (Vmp)	V	41
Maximum Power Current (Imp)	A	9.76
Module Efficiency	%	21.3
Maximum System Voltage	V	DC 1,500
Temperature Coefficient of Pmax	% / °C	-0.340
Temperature Coefficient of Voc	% / °C	-0.270
Temperature Coefficient of Isc	% / °C	+0.040

String Layout Examples

Example Gecko 5 kW 1-phase system:
This 5 kW system is offered if the customer already has an existing solar system and the DNSP only allows up to 10 kW of total inverter size to be connected at the premises.

A maximum of 10 kW of PV can be connected to the x2 MPPTs. Each MPPT can have only one string connected to it as shown in the table below. This could be two strings of 9 x 400 W panels, with each string going into one of the MPPTs.
Note: The maximum PV voltage at the lowest expected temperature must be below 500 Vdc.

PV String Input Data for 5kW Gecko 1-Phase	
Max allowable PV (W)	10,000
Max usable PV (W)	7,500
Max. DC input voltage (V)	500
Start-up voltage (V)	125
MPPT voltage range (V)	150-425
Max. operating PV input current (A)	13+13
Max. input short-circuit current (A)	19.5+19.5
No. of MPPT trackers	2
No. of strings per MPPT tracker	1+1

Example Gecko 10kW 1-phase system:
A maximum of 20 kW of PV can be connected to the x3 MPPTs. Each MPPT can have two strings connected in parallel as shown in the table below. These parallel strings must be the same length and be oriented in the same direction. These could be laid out as three instances of 2 strings of 8 panels in parallel with each instance going to a MPPT (giving 19.2 kW).

PV String Input Data for 10kW Gecko 1-Phase	
Max allowable PV (W)	20,000
Max. usable PV (W)	15,000
Max. DC input voltage (V)	500
Start-up voltage (V)	125
MPPT voltage range (V)	150-425
Max. operating PV input current (A)	26+26+26
Max. input short-circuit current (A)	44+44+44
No. of MPPT trackers	3
No. of strings per MPPT tracker	2+2+2

Example Gecko 12kW 3-phase system:
A maximum of 24 kW of PV can be connected to the x2 MPPTs, however this is configured with one string going to the first MPPT and two equal length and parallel strings going to the second MPPT. Note that with this Inverter the maximum PV voltage is 800 V. The installer needs to follow the current rules for residential homes.

If the limit is 600 Vdc then a typical PV string layout using the 400 W panels described above would allow a maximum of 45 panels to be connected and still claim the STCs. However, with a maximum PV string voltage of 600 V, up to 11 panels could be connected in series.

These could be laid out as 2 strings of 11 panels in parallel going to the higher rated MPPT, and 1 string of 11 panels going to the other MPPT. In this case a maximum of 33 x 400 W of this specification panels could be connected = 13.2 kW of PV panels.

PV String Input Data for 12kW Gecko 3-Phase	
Max allowable PV (W)	24,000
Max. usable PV (W)	18,000
Max. DC input voltage (V)	600
Start-up voltage (V)	160
MPPT voltage range (V)	200-650
Max. operating PV input current (A)	26+13
Max. input short-circuit current (A)	39+19.5
No. of MPPT trackers	2
No. of strings per MPPT tracker	2+1

Example Gecko 15kW 3-phase system:
A maximum of 30 kW of PV can be connected to the x2 MPPTs. Each MPPT can have two strings connected in parallel as shown in the below. These parallel strings must be the same length and be oriented in the same direction. Note that with this Inverter the maximum PV voltage is 800 V. The installer needs to follow the current rules for residential homes.

If the limit is 600 Vdc then a typical PV string layout using the 400 W panels described above would allow a maximum of 60 panels to be connected and still claim the STCs. However, with a maximum PV string voltage of 600 V, up to 11 panels could be connected in series.

PV String Input Data for 15kW Gecko 3-Phase	
Max allowable PV (W)	30,000
Max. usable PV (W)	24,000
Max. DC input voltage (V)	600
Start-up voltage (V)	160
MPPT voltage range (V)	160V-650
Max. operating PV input current (A)	36+36
Max. input short-circuit current (A)	54+54
No. of MPPT trackers	2
No. of strings per MPPT tracker	2+2

These could be laid out as 2 strings of 11 panels in parallel going each of the two MPPTs. In this case a maximum of 44 x 400 W of this specification panels could be connected = 17.6 kW of PV panels.
Note: that there are panels with other specifications that may be more suitable for a particular site.

Appendix D – Gecko (Deye Inverter) Fault Codes

Error code	Description	*Solutions*
F08	GFDI _Relay Failure	1. When inverter is in Split phase(120/240Vac) or three-phase system (120/208Vac) system, the backup load port N line needs to connect ground; 2. If the fault still exists, please contact your installer for help.
F13	Working mode change	1. When the grid type and frequency changed it will report F13; 2. When the battery mode was changed to “No battery” mode, it will report F13; 3. For some old FW version, it will report F13 when the system work mode changed; 4. Generally, it will disappear automatically when shows F13; 5. If still same, and turn off the DC switch and AC switch and wait for one minute and then turn on the DC/AC switch; 6. Seek help from RedEarth if cannot go back to normal state.
F18	AC over current fault of hardware	AC side over current fault 1. Please check whether the backup load power and common load power are within the range; 2. Restart and check whether it is in normal; 3. Seek help from us, if cannot go back to normal state.
F20	DC over current fault of the hardware	DC side over current fault 1. Check PV module connect and battery connect; 2. When in the off-grid mode, the inverter startup with big power load, it may report F20. Please reduce the load power connected; 3. Turn off the DC switch and AC switch and then wait one minute, then turn on the DC/AC switch again; 4. Seek help from us, if cannot go back to normal state.
F22	Tz_EmergStop Fault	Please contact your installer for help.
F23	AC leakage current is transient over current	Leakage current fault 1. Check PV side cable ground connection. 2. Restart the system 2~3 times. 3. If the fault still exists, please contact us for help.
F24	DC insulation impedance failure	PV isolation resistance is too low 1. Check the connection of PV panels and inverter is firmly and correctly; 2. Check whether the PE cable of inverter is connected to ground; 3. Seek help from us, if cannot go back to normal state.
F26	The DC busbar is unbalanced	1. Please wait for a while and check whether it is normal; 2. When the hybrid in split phase mode, and the load of L1 and load of L2 is big different, it will report the F26. 3. Restart the system 2~3 times. 4. Seek help from us, if cannot go back to normal state.
F29	Parallel CANBus fault	1. When in parallel mode, check the parallel communication cable connection and hybrid inverter communication address setting; 2. During the parallel system startup period, inverters will report F29. when all inverters are in ON status, it will disappear automatically; 3. If the fault still exists, please contact us for help.
F34	AC Overcurrent fault	1. Check the backup load connected, make sure it is in allowed power range; 2. If the fault still exists, please contact us for help.
F35	No AC grid	No Utility 1. Please confirm grid is lost or not; 2. Check the grid connection is good or not; 3. Check the switch between inverter and grid is on or not; 4. Seek help from us, if cannot go back to normal state.
F41	Parallel system stop	1. Check the hybrid inverter working status. If there's 1 pcs hybrid inverter is in OFF status, the other hybrid inverters may report F41 fault in parallel system. 2. If the fault still exists, please contact us for help.
F42	AC line low voltage	Grid voltage fault 1. Check the AC voltage is in the range of standard voltage in specification; 2. Check whether grid AC cables are firmly and correctly connected; 3. Seek help from us, if cannot go back to normal state.
F47	AC over frequency	Grid frequency out of range 1. Check the frequency is in the range of specification or not; 2. Check whether AC cables are firmly and correctly connected; 3. Seek help from us, if cannot go back to normal state.
F48	AC lower frequency	Grid frequency out of range 1. Check the frequency is in the range of specification or not; 2. Check whether AC cables are firmly and correctly connected; 3. Seek help from us, if can not go back to normal state.
F56	DC busbar voltage is too low	Battery voltage low 1. Check whether battery voltage is too low; 2. If the battery voltage is too low, using PV or grid to charge the battery; 3. Seek help from us, if can not go back to normal state.

F58	BMS communication fault	1. It tells the communication between hybrid inverter and battery BMS disconnected when"BMS_Err-Stop" is active; 2. If don't want to see this happen, you can disable "BMS_Err-Stop" item on the LCD; 3. If the fault still exists, please contact us for help.
F63	ARC fault	1. ARC fault detection is only for US market; 2. Check PV module cable connection and clear the fault; 3. Seek help from us, if cannot go back to normal state.
F64	Heat sink high temperature failure	Heat sink temperature is too high 1. Check whether the work environment temperature is too high; 2. Turn off the inverter for 10mins and restart; 4. Seek help from us, if cannot go back to normal state.

Power yourself.