Gecko2

Installation and Operation Manual

RedEarth's Gecko hybrid range provides Australian-made, scalable energy storage systems designed for reliable long-term operation in residential applications.

Gecko systems are available in both single-phase and three-phase configurations and are rated IP43 for compliant outdoor installation.

These systems have a maximum capacity of eight Troppo Ultra batteries – 44.8kWh capacity.

Fast installs   **One pallet**   **Plug 'n' Play**

Version 1.0

Safety Instructions

Symbol	Explanation
ℹ️	Indicates additional information, emphasised contents or tips that may be helpful.
⚡	Caution, risk of electric shock.
⚠️	Caution, risk of danger.
⚡🔟	Do not touch live parts until 10 minutes after disconnection from the power sources.

> ⚠️ **WARNING:** Working on the inside of the Gecko2 system is restricted to qualified personnel. RedEarth recommend installation by licensed electricians only.

⚠️ 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

⚠️ The Gecko2 must only be installed by suitably qualified personnel who have read and are familiar with its operation and hazards.

⚠️ The battery provided with this system must only be charged by the Deye 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.

ℹ️ In the event of a fire evacuate the area and call emergency services. A dry agent fire extinguisher should be readily available and used. DO NOT use water. MSDS document is provided with the system and can be found at https://redearth.energy/troppo-safety-data-sheet/

🗑️ Do not use a damaged battery. Batteries should only be disposed of at an appropriate recycling centre. Please contact RedEarth for advice.

⚡ 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.

⚡ 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.

Lifting hazard

The Gecko2 is heavy. Observe proper lifting techniques. To reduce the weight the Troppo Ultra batteries can be removed.

Fire

The Gecko2 uses RedEarth's Troppo Ultra battery. This is a lithium-iron-phosphate based battery (LFP). It is the safest lithium chemistry. However, in the case of a fire the following steps should be taken. A dry agent fire extinguisher should be readily available and used. DO NOT use water. Evacuate the area and call emergency services. Toxic gas may be produced if the battery catches fire. **Note:** The SDS document for the Troppo Ultra Battery can be found at https://redearth.energy/troppo-safety-data-sheet/

RedEarth ENERGY STORAGE

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Overview

Gecko2 is an Australian-made residential hybrid power system designed to integrate multiple energy functions into a compact installation footprint. Gecko2 provides a **7-in-1 value stack,** incorporating solar power generation, battery energy storage, power conversion (PCS), and energy management (EMS). Optional add-on modules include a DC EV charger, AC EV charger, and a V2G bi-directional charger.

Gecko2 is suitable for both on-grid and off-grid applications and is available in the following inverter configurations:

- **Single-phase:** 5 kWac or 10 kWac
- **Three-phase:** 12 kWac or 15 kWac

The system can source energy from solar PV, 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.

For residential users, Gecko2 reduces electricity costs, optimises daily energy usage—including EV charging—and contributes to lowering the home's carbon footprint.

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.

Monitoring and control are provided through RedEarth's EMU app, available for both Apple and Android devices.

Installation Features

- Gecko2 system can easily be **retrofitted to an existing PV solar system** that may already be installed at the home.
- **Solar panels:** Up to 24kW of panels can be connected to the 15kW 3-phase Gecko2 and 20kW of panels to the 10kW 1-phase Gecko2. 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.
- **Gecko2 is fully certified to AS4777.2:2020 & IEC62109.1&2 & AS60950.1** and conforms to the Australian Battery Safety Guide.

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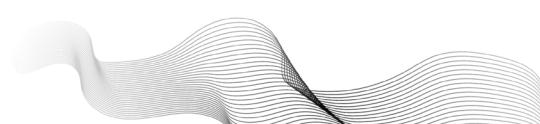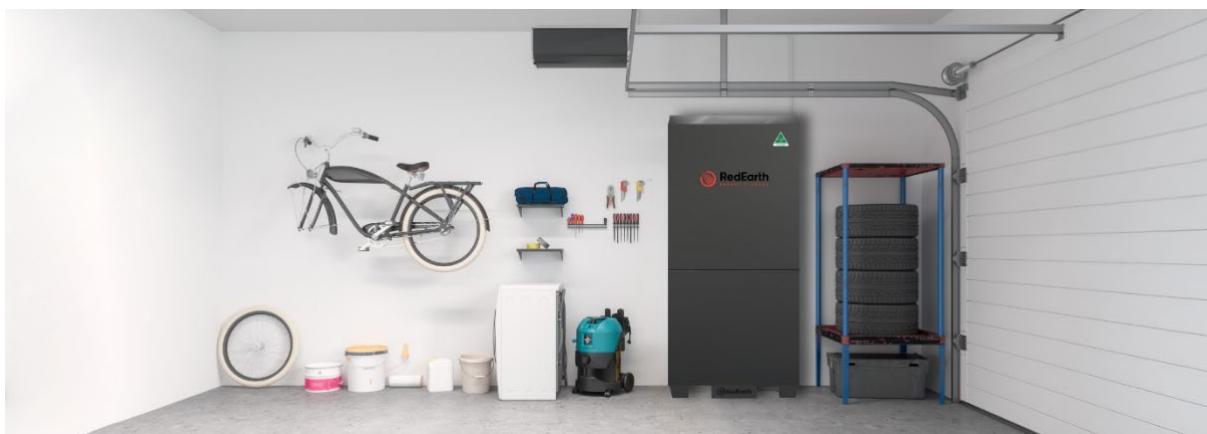
RedEarth's Private Power Plant (PPP)

Transforming your home into a more valuable and lucrative investment is easily achievable through the integration of RedEarth systems and proprietary Private Power Plant (PPP). As we step into an electrified future, homes need to be ready. By harnessing the untapped potential of your rooftop, you can generate up to three times the amount of solar energy needed to power your residence or business. The result? Your property becomes your very own Private Power Plant, RedEarth's ground-breaking innovation that offers a myriad of advantages.

Go beyond the battery

Our ever-growing set of PPP modules include:

Remote Control	Energy Trading	Smart EV Charging	Peer to Peer	Blackout Protection	Smart Load Control	Peak Shaving
Use your battery like a remote	Access wholesale pricing and our trading algorithm	Flexible car charging (incl. V2G)	Share your excess power with family and friends	Turn on Disaster Protection Mode	Manual or automatic control of high power load items	Reduce your dependence on grid during high load times

With RedEarth systems installed, you not only gain access to a **continuous source of renewable energy** but also **create an additional revenue stream** by feeding surplus energy back into the grid. This not only offsets your energy costs but could even turn a profit. Additionally, you contribute to a sustainable future by significantly reducing energy waste and, over time, effectively eliminating power bills. The decision to "*RedEarth-ify*" your home is not just an investment in the present but a forward-thinking step towards financial security, eco-friendliness, and long-term value enhancement for your property.

RedEarth offers its PPP to generate more value for Gecko2 battery system owners than is available from other battery systems.
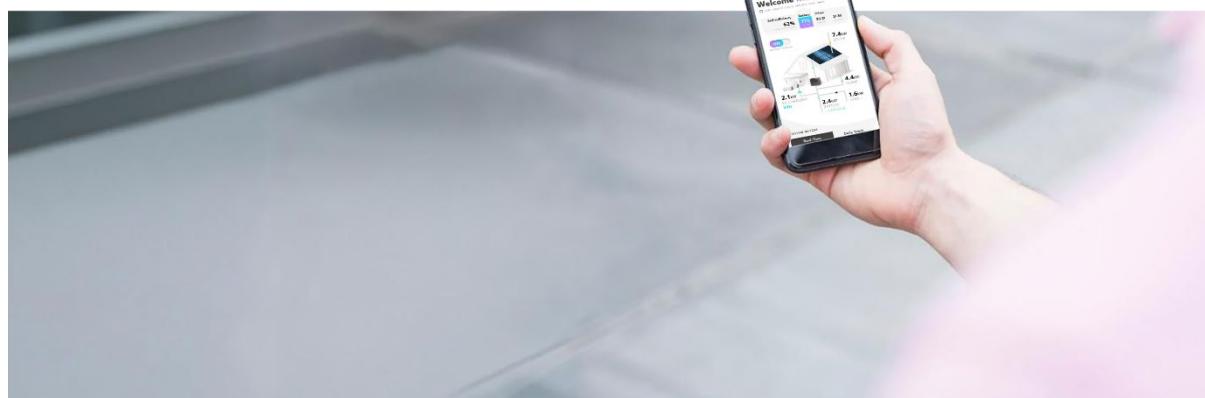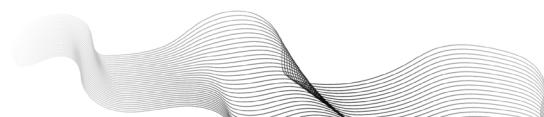
Dimensions and positioning information
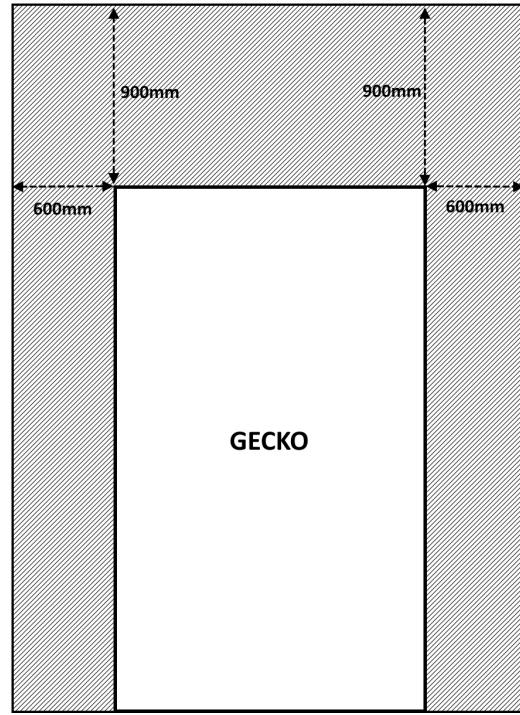
Gecko2 size and weight:

- 460kg – 500kg (5kW – 15kW) with 8 x TROPPO Ultra Lithium batteries (45kg per battery)
- 100kg – 140kg (5kW – 15kW) complete without batteries.
- 1950H x 1060W x 450D [mm]

Positioning information summary & IP rating:

- Above image shows minimum clearance around Gecko2 where no windows or doors are allowed According to **AS/NZS 5139**. (Not To Scale)
- Outdoor rated to **IP43,** recommended for semi protected outdoor areas (i.e. under an awning or beside a house/shed under an eave etc.)
- Gecko2 should be installed in a shaded area and sheltered from direct sunlight in the middle of the day. To reduce the likelihood of derating or shutting down due to high temperatures.
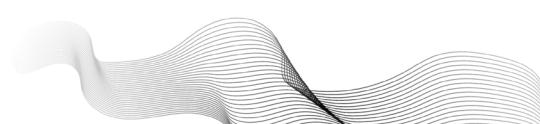
Overview of installation tasks

A typical complete installation of the Gecko2 home battery will require the electrical connection of the following items. If the home is only off-grid then there is no need to connect the grid or the feed-in meter/CT, but a backup generator will very likely be required.

Note: Differences between 1-phase and 3-phase systems are highlighted where necessary.

1. **Grid:** AC cables run from the MSB (Main switchboard) directly to the grid terminals inside the Gecko2 system. In 3-phase system observe the correct phase rotation.

2. **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 Gecko2 system via a Cat5/6 cable or similar (not supplied). *The information from this meter affects the operation of the Gecko2 system, make sure both the wires and CT are connected the right way around.*
   o In addition to the Feed-in meter the MSB will also require a MCB to be installed to allow the Gecko2 system to be isolated, for example to work on the MSB.

3. **Load:** AC cables from the MSB directly to the Load terminals inside the Gecko2 system.
   o **Note:** The Gecko2 system is designed as a whole home backup system, however if the loads in a particular house are greater than the capacity of the Gecko2 system then the loads inside the MSB will need to be split to ensure that the backed-up circuits do not overload the Gecko2 system.
   o The Gecko2 3-phase is rated at 15kW or 12kW and the 1-phase at either 10kW or 5kW, depending on which system was ordered. Loads such as pool pumps and under floor heating should probably not be backed up.
   o Putting too many loads on the backed-up circuit can also empty the battery quickly during an outage. In this case additional battery capacity may be required. Note that the Gecko2 has a multi-purpose SMART Port that can act as a Smart load which can be programmed to turn off at a pre-determined battery state-of-charge (SOC) leaving the remainder of the battery capacity for more critical loads. see details below under **Optional - SMART Port connection.**

4. **Solar:**

Specification	5kW 1-Phase Gecko2	10kW 1-Phase Gecko2	12kW 3-Phase Gecko2	15kW 3-Phase Gecko2
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	500Vdc	500Vdc	600Vdc *(limited for residential installation)*	600Vdc *(limited for residential installation)*

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

5. **Batteries:** The Gecko2 is pre-wired for up to eight Troppo Ultra batteries. Each Troppo Ultra battery has a nominal capacity of 5.6kWh. The batteries need to be installed and plugged in.

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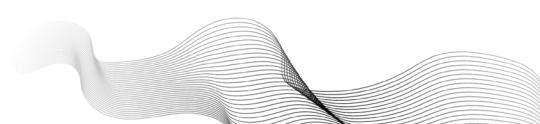
6. **Remote monitoring:** The Gecko2 system needs to be connected to the internet to provide its full capabilities. Note this applies to both on-grid and off-grid Installations. If no Internet connection is available, then no remote monitoring is available for the Gecko2 system. RedEarth provides 4G internet during the first 3-month trial of any Gecko2 installation. After the 3-month trial the customer can choose to join RedEarth's Optimum Customer Support program, and the 4G internet option will continue, otherwise the customer can provide their own internet if they want remote monitoring.
   o A cell phone booster option is also possible in areas with poor mobile phone coverage. Contact RedEarth for details.
   o Hard-wired internet cable from the home internet router to the Gecko2 system can be installed if available. This provides the most robust communication link versus a Wi-Fi or 4G signal.

7. **Optional - SMART Port connection:** The Gecko2 system has a third AC connection option, the SMART Port that can perform different functions depending on how it is configured. It can connect an auto-start generator, but it can alternatively be configured to either connect and manage a separate AC-coupled PV inverter OR it can power a "smart load" such as a pool heater or crypto miner. See notes below. ***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***.
   o Smart Load: If connecting a smart load, run your designated smart circuit into the ac breaker labelled Smart / Gen. This load will run when the batteries are above a programmed state of charge, and power down when the batteries fall below this SOC. For example, an air-conditioned 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.
   o AC Coupled Solar: An AC coupled solar Inverter or micro-inverter can be connected into the terminal labelled **Smart / Gen terminal**. This opens up the opportunity to redirect the output of an existing PV system to this port, allowing it to be controlled by the Gecko2 system. Note: It is important that the shutoff frequencies are set appropriately so that the Gecko2 system can correctly manage this extra AC-coupled PV system (consult RedEarth tech support), and it Is also essential that the AC coupled PV does not exceed a 1:1 relationship to the Gecko2 inverter size (5kW or 10kW for 1-phase and 12kW or 15kW for 3-phase).
   o Generator: The SMART port is set to generator in the default configuration of the Gecko2. This mode will automatically call your generator when the SOC reaches a lower SOC (battery voltage setting), this will then stop the generator when the SOC reaches the higher SOC (battery voltage setting), If you require assistance adjusting these two set points contact RedEarth tech support. The Gecko2 includes a 2-wire generator auto-start feature. See Section 4.6 for details.

On-grid example

Off-grid example
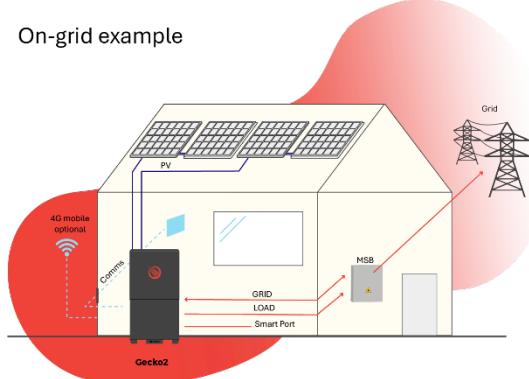
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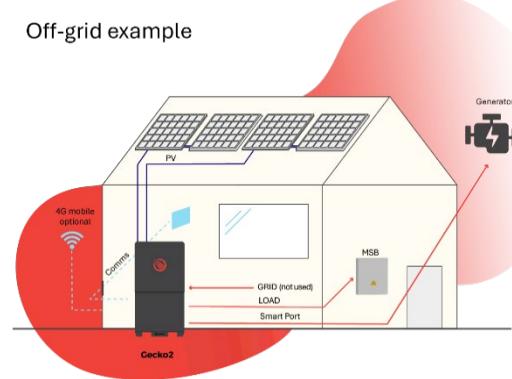
Key additional tasks to complete the installation include:

1. **Book the install with RedEarth:** When you know the installation date, book the time with RedEarth so that they are sure to be there to help you and, to confirm that the system and the remote monitoring is properly setup.
2. **Highly Recommended - receive training on the Gecko2 system at RedEarth's facility In Brisbane.** It Is also possible for RedEarth to provide training at reseller/installer facilities.
3. **Adjusting the programming of the Gecko2 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.
4. **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.
5. **Customer to scan the QR code:** This is important for the customer to be able to monitor their system on RedEarth's EMU app as well as access the benefits of RedEarth's Optimum and Private Power Plant features. It also registers the warranty.

Note: The Gecko2 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.

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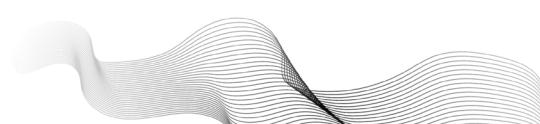
Internal components description

Opening the Gecko2

RedEarth's Gecko2 Home battery system can be accessed by removing the upper (inverter compartment) and lower (battery compartment) lids. To do this, 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 Gecko2 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 and cable connection, 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.

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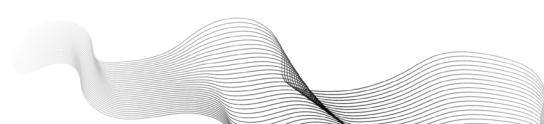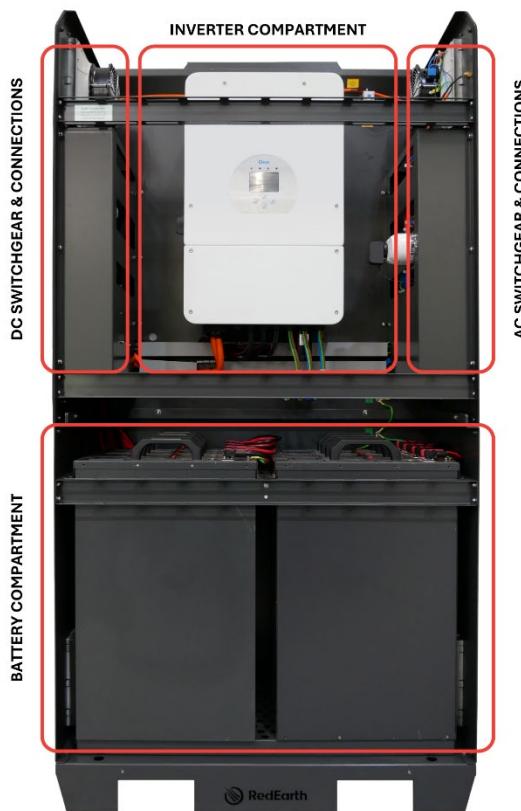
Battery Compartment

Up to eight (8) RedEarth Troppo Ultra 5.6kWh Lithium batteries can be installed in the Gecko2.
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 separately and installed during installation.

Inverter Compartment

Here you will find the Deye Inverter (5kW, 10kW for 1-Phase and 12kW, 15kW for 3-Phase). All the internal connections from the inverter to the AC and DC switchgear is completed in the factory, as well 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-side access door and remove the escutcheon panel (4 x HEX3 M5 Allen 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 PH2 M5 Phillips screws), in this location is the user accessible RedEarth Comms device the RUT.

For the DC switchgear, this is accessed on the left-side of the unit, open the left side access door and remove the escutcheon panel (6 x HEX3 M5 Allen screws). This is where the DC protection and PV connection points are located.

There are labels to clearly identify where cables are 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 shown on left, AC shown on right)**
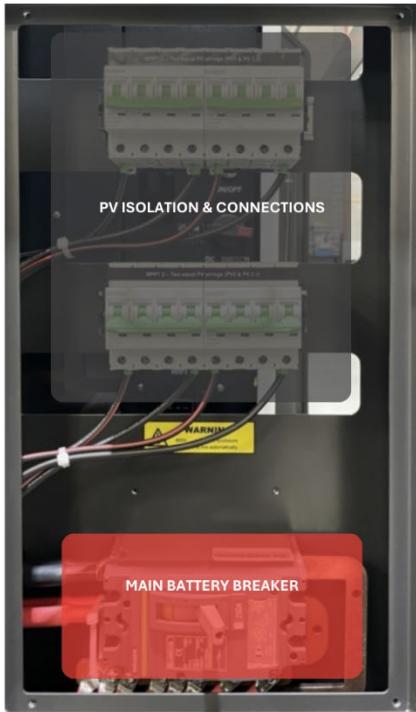
DC SWITCHGEAR AND CONNECTION POINT LOCATIONS

AC SWITCHGEAR AND CONNECTION POINT LOCATIONS
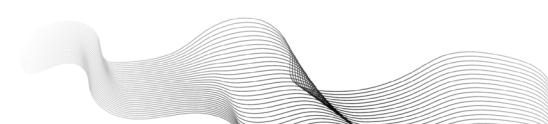
Parts Kit and Documentation

The Gecko2 is supplied with documentation and a parts kit box to complete the installation.

Documentation

- o Gecko2 Installation Manual
- o Gecko2 User Manual
- o Gecko2 Identification Sheet (serial #s etc)
- o Feed-in meter manual (Eastron)
- o Inverter manual – Deye
- o MSDS – Troppo Ultra battery

Parts Kit Box

- o Documentation listed above.
- o 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 and three for 3-phase). Note: that a Cat5/6 cable or similar is required to connect the feed-In meter back to the Gecko2 system, this cable is NOT supplied and needs to be provided by the installer.
- o Stickers and Traffolytes required to complete the installation.
- o 10 x Dynabolts or Concrete bolts for securing the Gecko2 system to the wall and ground.
- o Set of leveling shims
- o 7x M25 glands (suitable for sealing around 25mm flexible conduit)
- o 2x M32 glands (suitable for sealing around 32mm flexible conduit)
- o 4 x M8 Allen Screws (HEX5) with M8 washers
- o 16 x M6 Phillips Cage screws (PH2)
- o 1 x Screw in Wi-Fi antenna
- o 1 x Screw in 4G antenna
- o 1 x Extension 4G antenna
- o Suitable circuit breakers for installation into the switchboard to isolate the Gecko2 in MSB

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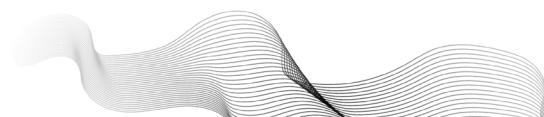
Installation: 8 Steps for Installation and Customer Handover

The Gecko2 system is designed to be easy to install. It includes pre-wired connection points and comprehensive labelling and parts kit to simplify the installation.

Technical support is available directly from RedEarth during installation if required. Contact details are included at the back of this manual.

8 Steps to Complete your Gecko2 Installation:

1. Transporting – getting the Gecko2 to site.
2. Positioning and mounting – the Gecko2 in its final location
3. Solar installation – including bringing the PV cabling to the Gecko2 system.
4. Electrical connections – at the Gecko2 system and the house switch board
5. Understanding turn on/shutdown procedures.
6. Commissioning the system – turning on and programming and confirming system operation
7. Activating remote Monitoring and Communications – contact RedEarth to confirm remote operation.
8. Customer Handover – including scanning the QR code and their access to the EMU app.

Step 1.   Transporting

The Gecko2 system is usually supplied on a pallet, with the batteries in separate cardboard boxes. It has been factory tested; however, the batteries are subsequently removed from the unit for transportation.

System Weights (without batteries):
- The lower battery compartment weighs 35kg.
- The upper inverter compartment weights as below.
    - 5kW 1-phase system weighs 65kg
    - 10kW 1-phase system weighs 85kg
    - 12kW 3-phase system weighs 90kg
    - 15kW 3-phase system weighs 105kg.

Image above shows a Gecko2 system with separate batteries packed on a single pallet

⚡	**WARNING: Personal Injury** Use safe lifting practices and standard safety equipment when transporting and installing the Gecko2 system.

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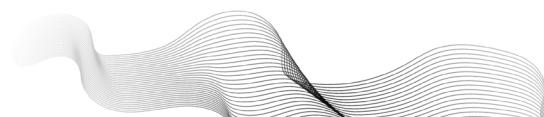
Step 2. Positioning & Mounting

The Gecko2 system is designed as a wall and ground supported weatherproof system (IP43).
It should be installed in a shaded area and sheltered from direct sunlight in the middle of the day (i.e. in a garage, or down the side of a house or shed) this is 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 at this point It will shut down. (Once the system cools down, it will restart automatically). If possible, it should be placed closer to the solar panels and the main switchboard to minimise cable run length and voltage drop/power loss.

- As the system is deisgned to be mounted to a wall, to comply with Australian standards for a house, allow space around the system as shown In the diagram below (no doors or windows within the shaded area). This is to be in compliance of AS/NZS 5139.

Note: the material that the wall is made of (its flammability) can influence the allowed positioning.

Cooling airflow passes up through intake filters in the base and sides of the Gecko2 system and then out through extraction fans/filters at the top of the unit. The fans are controlled by an adjustable temperature switch set to 25^0C in the factory. Do not block any intake or exhaust vents, otherwise the system will overheat and shutdown.

There is a total of six (6) filter elements, four (4) Intakes and two (2) Extraction fans. To maintain warranty of the system the filters must be cleaned or replaced as per the schedule below depending on the installation location:

Indoor Areas
- Cleaning every 4 months
- Replacement every 2 years

Outdoor and Dusty Areas
- Cleaning every 2 months
- Replacement every 1 year
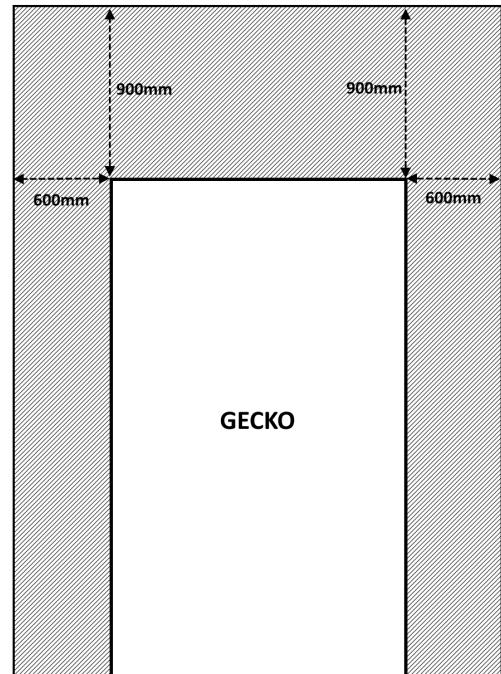
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Gecko2 Minimum Clearance According to AS/NZS 5139 (not to scale)

The location of all 6 filters and the process of removing and installing the filters must be shown to the customer as a part of the customer handover process.

Note: *Gecko2 can be installed indoors. however, proper ventilation must be installed according to AS*/NZS 5139.
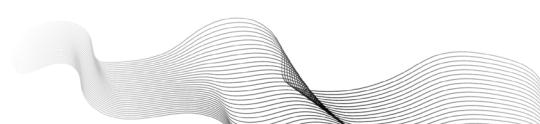
2.1   Installation & Mounting Order

1. Install the lower and upper wall mounts using the supplied Dynabolts or material appropriate fixings. The centreline of the mounts must be aligned. This centreline will also be the centreline of the entire Gecko2 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 720mm
   - Upper mount - floor to bottom edge of mount is 1895mm
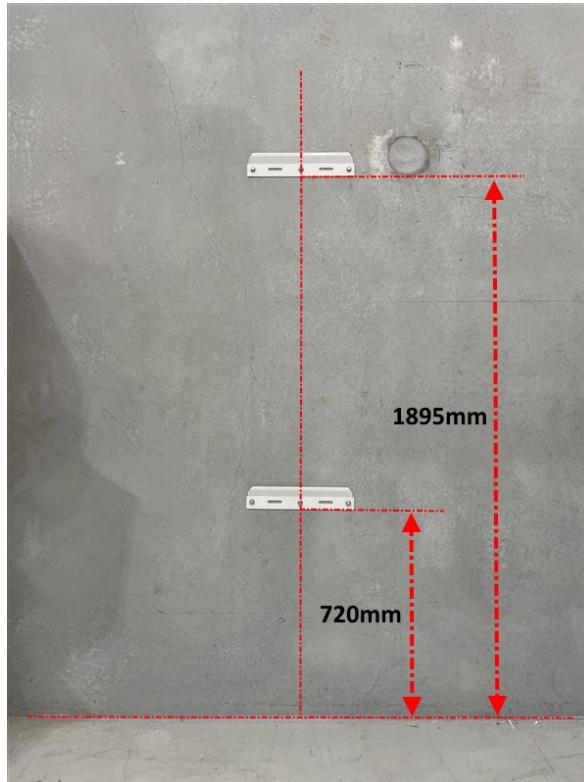
2. Lift the battery compartment over the lower wall mount and ensure the mount has been correctly inserted in the receiving slot.

3. If required, use the supplied leveling shims to ensure an even gap is maintained to the wall behind. As the wall and ground may not be perpendicular (90°) to each other, shims may be required on the front or rear feet of the Gecko2, to maintain an even wall gap.

4. Once in position, use the holes in the feet to mark the location of the ground mounting holes required for the supplied Dynabolts or material appropriate fixings.

5. Remove the battery compartment and install the Dynabolts or material appropriate fixings.

6. 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 battery compartment to ground using installed Dynabolts or material appropriate fixings.
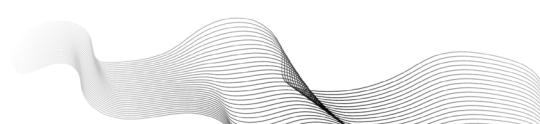
7. Use silicon sealant to seal around the lower mount and the enclosure slot. This is to ensure any water or insects that can get between the Gecko2 and the wall behind, cannot enter via the mounting slot. **Take a clear photo of this completed, to be logged as a part of the warranty for the unit.**

8. 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 Gecko2 inverter compartment while being lifted into place onto the lower battery compartment.

9. 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 in position onto the 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! Use safe lifting practices and standard safety equipment when installing the Gecko2 systems. System weights can be found above in **"Step 1 Transporting"**

10. Use the supplied 4 x M8 Allen Screws (HEX5) and washers, to securely mount inverter compartment to the battery compartment

Once the above steps are complete the Gecko2 is ready to be wired to the MSB, PV and Generator/Smart load/AC coupled solar, etc.
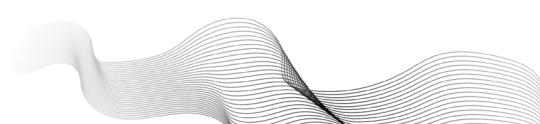
Step 3. Solar Installation

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.

3.1   PV String Configuration

String voltage overview:
Specifications of a typical 400W Solar panel are listed below.
If the maximum string voltage is 500V then the maximum number of panels that can be connected in series is nine, in an area where the temperature may drop to 0degC during the day.

This is because the VoC increases from 49.5V to 52.8Vdc at 0degC.

This is calculated as follows:

25degrees (difference from 25degC to lowest expected temp of 0degC) x -0.270%/degC = 6.75% voltage Increase from 49.5V. Therefore, the maximum panel voltage that can be expected = 49.5 x 1.0675 = 52.8Vdc. So only nine (9) panels can be connected in series to stay under 500Vdc 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
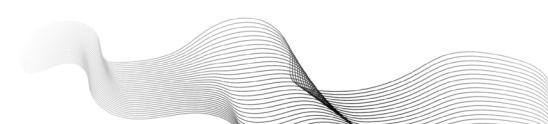
Example Gecko2 5kW 1-phase system:

This 5kW system Is offered if the customer already has an existing solar system and the DNSP only allows up to 10kW of total inverter size to be connected at the premises.

A maximum of 10kW 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 400W panels, with each string going into one of the MPPTs. Note: also that the maximum PV voltage at the lowest expected temperature must be below 500Vdc.

PV String Input Data for 5kW Gecko2 1-Phase	
Max allowable PV (W)	10,000W
Max usable PV (W)	7,500W
Max. DC input voltage (V)	500V
Start-up voltage (V)	125V
MPPT voltage range (V)	150-425V
Max. operating PV input current (A)	13A+13A
Max. input short-circuit current (A)	19.5A+19.5A
No. of MPPT trackers	2
No. of strings per MPPT tracker	1+1

Example Gecko2 10kW 1-phase system:

A maximum of 20kW 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 19.2kW).

PV String Input Data for 10kW Gecko2 1-Phase	
Max allowable PV (W)	20,000W
Max. usable PV (W)	15,000W
Max. DC input voltage (V)	500V
Start-up voltage (V)	125V
MPPT voltage range (V)	150-425V
Max. operating PV input current (A)	26+26+26A
Max. input short-circuit current (A)	44+44+44A
No. of MPPT trackers	3
No. of strings per MPPT tracker	2+2+2

Example Gecko2 12kW 3-phase system:

A maximum of 24kW 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 800V. The installer needs to follow the current rules for residential homes.

PV String Input Data for 12kW Gecko2 3-Phase	
Max allowable PV (W)	24,000W
Max. usable PV (W)	18,000W
Max. DC input voltage (V)	600V
Start-up voltage (V)	160V
MPPT voltage range (V)	200V-650V
Max. operating PV input current (A)	26A+13A
Max. input short-circuit current (A)	39A+19.5A
No. of MPPT trackers	2
No. of strings per MPPT tracker	2+1

If the limit is 600Vdc then a typical PV string layout using the 400W 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 600V, 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 33x400W of this specification panels could be connected = 13.2kW of PV panels.

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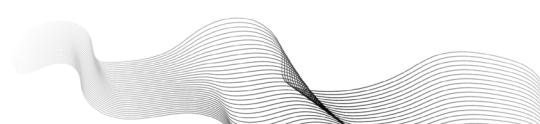
Example Gecko2 15kW 3-phase system:

A maximum of 30kW 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 800V. The installer needs to follow the current rules for residential homes.

PV String Input Data for 15kW Gecko2 3-Phase	
Max allowable PV (W)	30,000W
Max. usable PV (W)	24,000W
Max. DC input voltage (V)	600V
Start-up voltage (V)	160V
MPPT voltage range (V)	160V-650V
Max. operating PV input current (A)	36A+36A
Max. input short-circuit current (A)	54A+54A
No. of MPPT trackers	2
No. of strings per MPPT tracker	2+2

If the limit is 600Vdc then a typical PV string layout using the 400W 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 600V, up to 11 panels could be connected in series.

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 44x400W of this specification panels could be connected = 17.6kW of PV panels.
Note: that there are panels with other specifications that may be more suitable for a particular site.

3.2   PV Isolators

The PV isolation is provided in the Gecko2 via built-in MCBs. The number of MCBs depends on the size of the Gecko2 system:
- 5kW = 2 strings and 2 MCBs
- 10kW = 6 strings and 3 MCBs
- 12kW = 3 strings and 3 MCBs
- 15kW = 4 strings and 4 MCBs

See image to the right for the 15kW 3-phase system. The individual PV cables are brought into the DC side or rear of the unit and connected to the MCBs.
It is important to connect PV strings of equal length and orientation when 2strings 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 Allen screw HEX3). 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)*

Step 4. Electrical Connections

ⓘ   *Before any electrical connections are made, check all internal connections in the Gecko2 are secure and have not come loose during transport.*

ⓘ   *Ensure that all breakers and isolators, as well as those supplying power to the unit, **are turned OFF**.*

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

ⓘ   *The Gecko2 system must be hardwired to a remote switchboard, which contains a MEN link and an earth stake.*

Gecko2's AC connections and switchgear is located on the right side of the unit. Open the right-side access door and remove the escutcheon panel (4 x M5 Allen screw HEX3). This will provide direct access to all the AC switchgear and all the connection points needed for installation.

Gecko2's communications device, the RUT, is located on the AC side of the unit. Below the AC escutcheon panel is the comms access panel it can be accessed by removing the 2 x Phillips head screws (PH2).

Gecko2's DC connections and switchgear is located on the left side of the unit. Open the left-side access door and remove the escutcheon panel (6 x M5 Allen screw HEX3). This will provide direct access to all the DC switchgear and all the connection points needed for installation.

See next page for rear/hidden cable entry access location template.
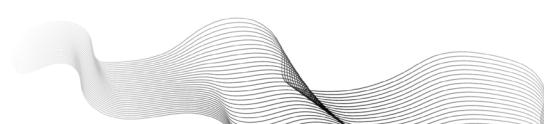
4.0.1 Rear/Hidden Cable Entry Access Template

When using the rear access gland holes on the back of the Gecko2, ensure the supplied glands (in parts kit) are used or sufficient weatherproofing is achieved 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.

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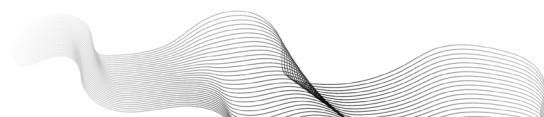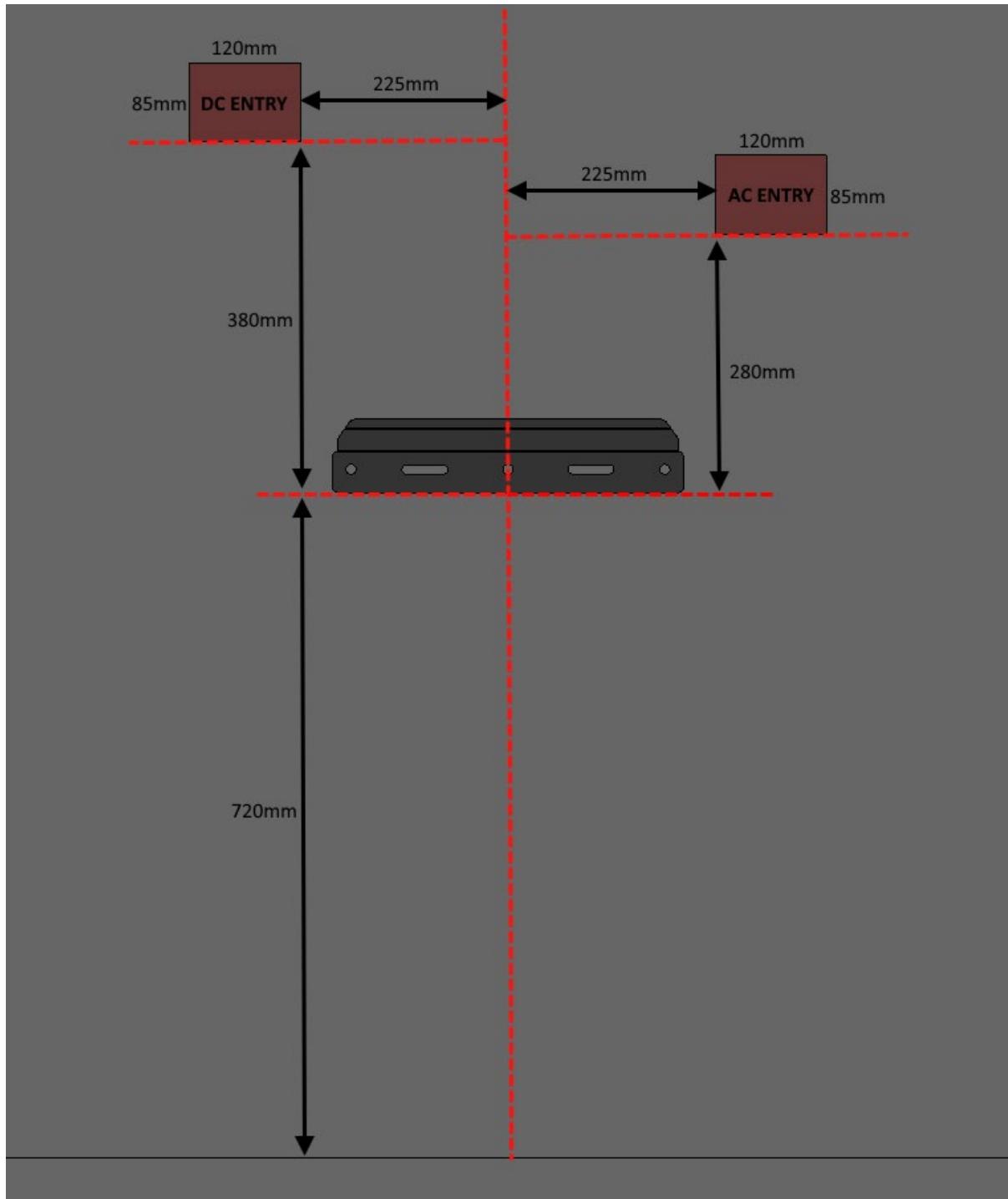
4.1   Battery Connection & Setup

The Gecko2 has been tested and commissioned at the RedEarth factory. The batteries are then removed for transportation/positioning. Follow the procedure below to correctly install the batteries.

4.1.1 Battery Connection

1.   Ensure the BATTERY SYSTEM D.C. ISOLATOR on the left-side of the Gecko2 is turned OFF. (MCCB breaker)

2.   Take the batteries out of the transport boxes and place them next to the Gecko2 system. Turn on the BMS displays of all the batteries on using the circular switch on the left side on the top of each battery to confirm that they are all at a similar voltage or SOC (within 0.5V or 1% diff.). The voltage can be read on each battery display as shown below. Ideally, they should all read above 53.0 volts or 70% SOC. Take note of the Battery number indicator, 1 is the master and 2, 3, 4... are slaves.

Note: If all batteries supplied are numbered "0" or "1" proceed to **4.1.2   Battery Setup (BMS master/slave)** below, then return to these steps once complete.

3.   On the battery compartment remove the lower lid (6 x M6 screws HEX4) and the support rail by removing the 4 x M6 Nuts & 2 x M6 Allen screws (HEX4).

4.   Install the Troppo Ultra batteries evenly left to right. Start loading by loading the Master battery numbered **"1"** from the left-most rear position first. Take note of physical installation order below **in Blue**. While also ensuring the battery numbering of the master and slaves, matches the numbering **in Red** as per the example of eight (8) batteries below. A six (6) battery system would be slightly different with its comms connection order, as there will be less batteries per bank (left & right).
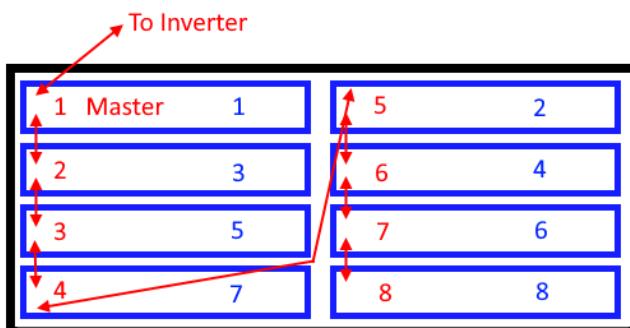
Note: the physical installation order may differ to the BMS comms connection battery order, this is to ensure the Gecko2 is evenly loaded mechanically. However, the BMS comms battery order is related to the Comms connections order below. The Master **"1"** should always be the rear left battery when looking at the unit from the front.

5. Reinstall the battery support rail removed in step 3 and secure the batteries to the cage nuts in the brackets using the M6 cage screws into the wings (rack ears) of the batteries (min. 2 per battery). Using a PH2 Phillips head screwdriver.

6. Ensure all battery earth link cables are connected in each battery bank (left & right) and that batteries numbered **in Blue** below **"1 & 2"** are connected to the battery compartment earth stud. Also, ensure the battery compartment earth stud is connected to the inverter compartment earth stud above it. These are clearly indicated with an Earth symbol sticker.

7. Plug the battery cables into the batteries, being careful that red goes to red and black goes to black. To attach battery cables to the battery terminal, simply push it 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.

Note: 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. This is what makes RedEarth Gecko2 system genuinely battery ready.

8. Connect the comms link cables starting from the "OUT" port of the rear left battery (Master **"1"**), along the left bank (rear to front) going "OUT" to "IN" battery to battery. Then from the "OUT" port of the left front battery to the "IN" of the right rear battery using small cat5/6 patch lead, then continuing along the right bank (rear to front). Refer to comms link diagram below **in Red** of an example with 8 batteries.
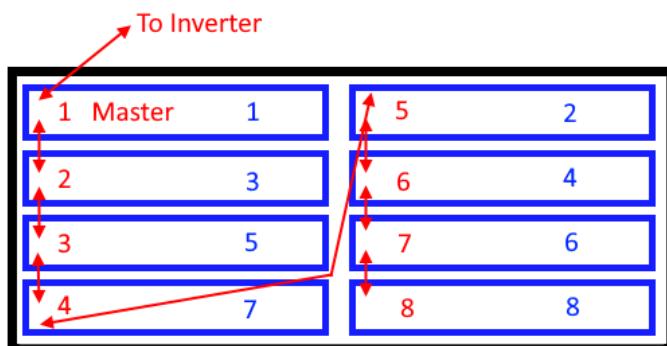
RED = Comms connection order
BLUE = Physical installation order

9. Connect the inverter comms cable that is pre-wired into the inverter, into the INV.CAN port on the left rear battery. This is the Master **"1"** battery for BMS communications to the inverter.

10. Turn the current protection breakers on top of each battery ON. You will notice some crossflow of electricity as the batteries balance with each other.
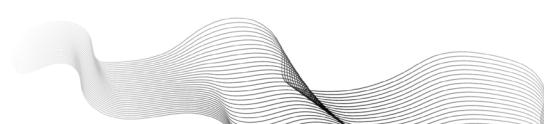
11. Ensure the Master **"1"** battery can see all the slave batteries, as per below image.
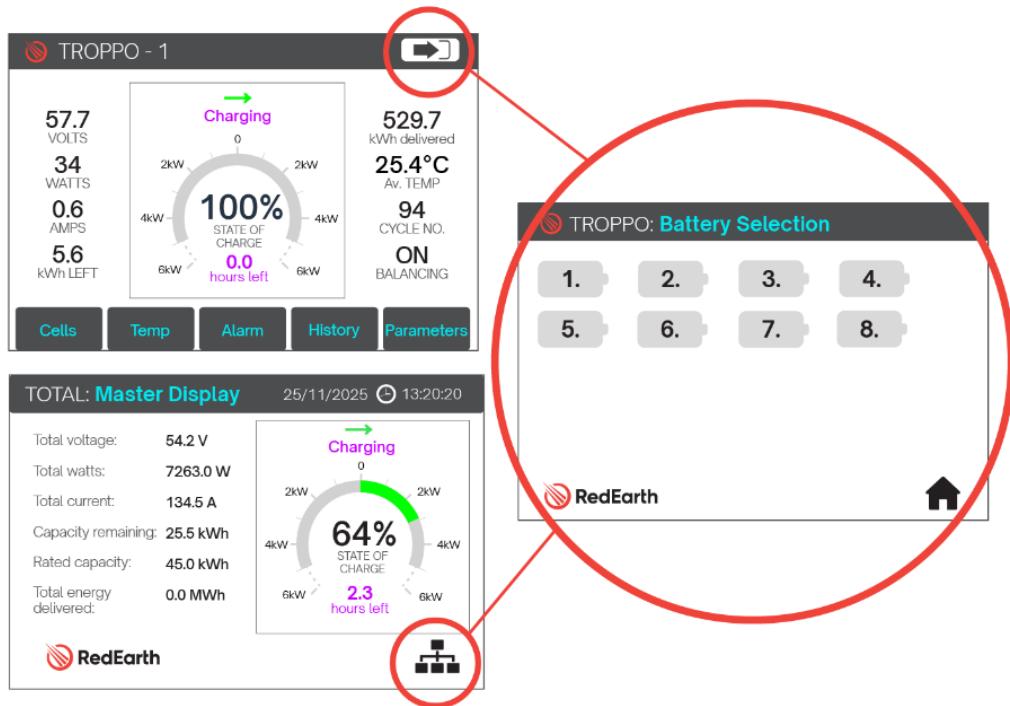
12. The battery bank is now ready to be used. The BATTERY SYSTEM D.C. ISOLATOR can be turned on when you are ready to turn on the system.

4.1.2 Battery Setup (BMS master/slave)

When 2 or more Troppo Ultras are in parallel, the Master battery needs to be assigned as '1' and the subsequent slave batteries need to be assigned '2, 3, 4....' onwards. The master battery is the one connected to the inverter's BMS. This can be assigned via each battery's screen by following the steps below:

1. Click on Parameters on the touchscreen of the battery.
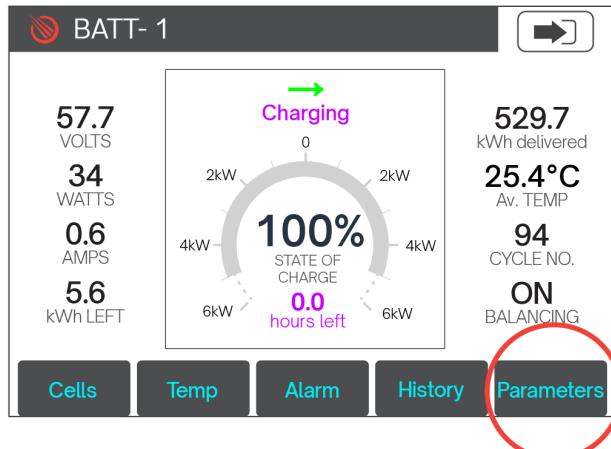
2. Enter the password = **1981**

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3. Select the Inverter you're connecting to = "Deye".

4. Tap the 'Manual' box on this screen to tick it.
5. Tap on the number after 'Select battery address (00-50)' and set the master battery to 1.
6. Tap on the number after 'Select battery address (00-50)' and set each slave battery from 2, 3, 4…. and so on. Ensure that no two batteries are assigned the same battery address. The number order should match as shown **in red** below for an example of a system with 8 batteries
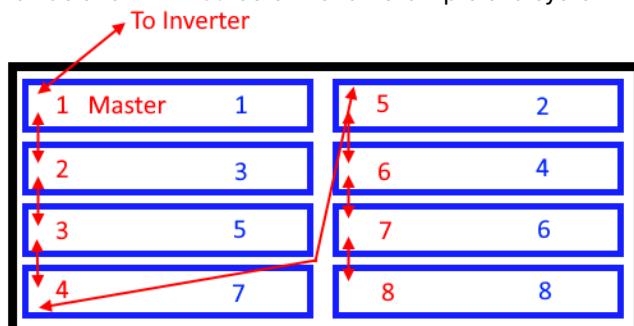
RED = Comms connection order
BLUE = Physical installation order

Note: Troppo Ultras that come as part of a RedEarth BESS system should already have this configuration done in the factory, simplifying the installation process. However, if this is not the case the above instructions can be followed.

4.2   Grid, Load and Smart Port Connection

MCBs and terminal blocks are installed and pre-wired on a single DIN rail to simplify making all the GRID, LOAD and SMART PORT connections during installation.
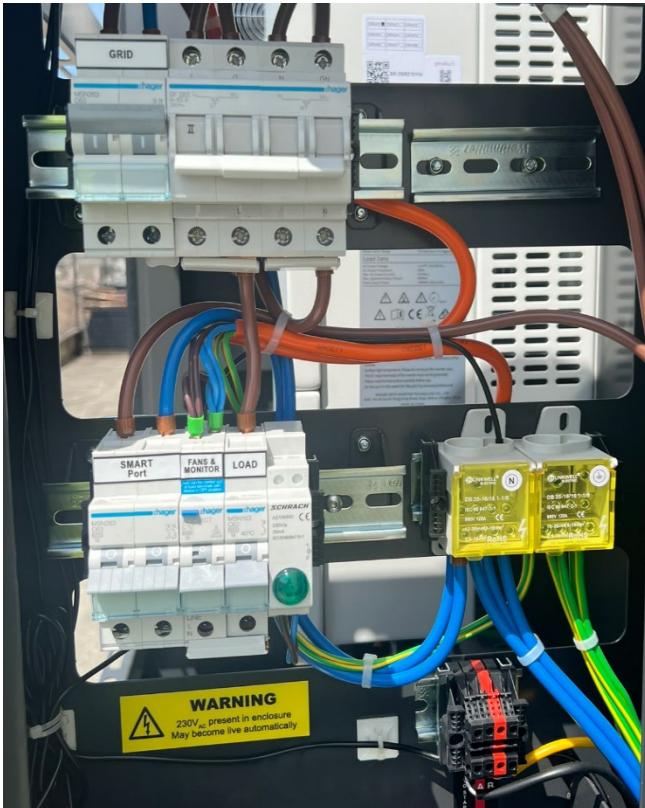
1-phase AC   **3-phase AC**
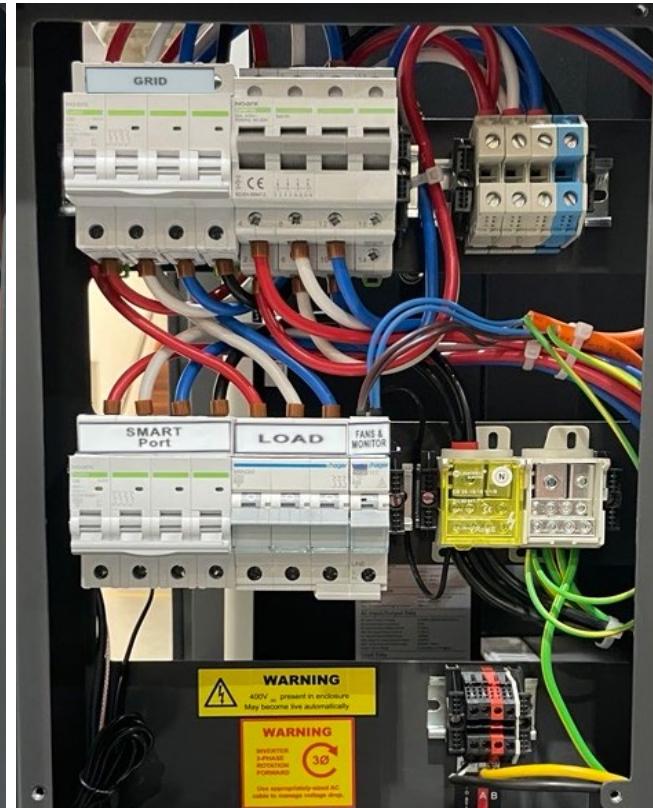
The terminal block (3-phase) or breaker (1-phase) labelled as GRID connects the Gecko2 directly to the Grid in the MSB.
Note: In off-grid Installations this connection is not required

The breaker labelled as LOAD identifies the connection point that remains live during a Black-out. Do not overload the LOAD circuit with too many circuits in the MSB. Depending on the inverter size the Gecko2 can support 5kW, 10kW, 12kW or 15kW of power from the battery.

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.

Generator Port: The generator setting is the default configuration of the Gecko2. This mode will automatically call your generator when the SOC reaches a lower SOC (battery voltage setting), this will then stop the generator when the SOC reaches the higher SOC (battery voltage setting), If you require assistance adjusting these two set points contact RedEarth tech support. The Gecko2 includes a 2-wire generator auto-start feature.

AC Coupled Solar: An AC coupled solar inverter, or micro-inverter can be connected into the MCB labelled SMART Port. This opens the opportunity to redirect the output of an existing PV system to this port, allowing it to be controlled by the Gecko2 system. Note: It is important that the shutoff frequencies

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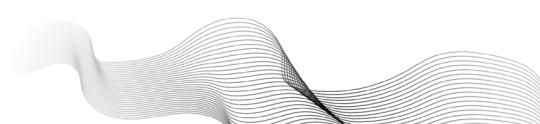
are set appropriately so that the Gecko2 system can correctly manage this extra AC-coupled PV system (consult RedEarth tech support), and it Is also essential that the AC coupled PV does not exceed a 1:1 relationship to the Gecko2 Inverter size (5kW, or 10kW for 1-phase or 12KW or 15kW for 3-phase).

Smart Load: If connecting a smart load, run your designated smart circuit into the ac breaker labelled SMART Port. This load will run when the batteries are above a programmed state of charge, and power down when the batteries fall below this SOC. For example, an air-conditioned 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.

Note: If you require assistance adjusting these set points, contact RedEarth tech support.

To connect the AC cables to the system, pass them through the 25mm or 32mm holes in the side or rear of the Gecko2 (the glands provided which are designed to seal around 25mm and 32mm flexible conduit). Secure the ends of the cable 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, 8, 10, 12 or 15KW inverter according to AS/NZS 3008.1.1:2017. All cables must be sized to appropriate Australian standards. 40A or 50A MCBs are installed in the Gecko2, depending on the kW rating of the inverter.

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

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

4.2 Main Switchboard Wiring & Feed-in Meter Installation

4.2.1 Whole Home Backup (requires sufficient inverter size)

If the whole home is being backed up by the Gecko2 (all circuits - like what happens in an off-grid installation) then there is no need to separate the circuits in the switchboard. Also, the CT built into the Gecko2 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.

- Installation of a double pole MCB breaker (1-phase) or 2 x 3-pole MCBs for the 3-phase installation, to isolate the Gecko2 system if work is being done in the switch board.
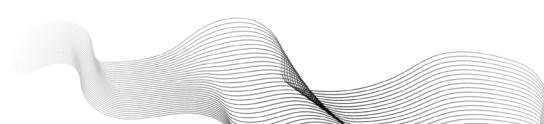
4.2.2 Partial Home Backup

Three tasks must be completed in the switch board for a complete Gecko2 installation when partial home backup is implemented:
Note: Refer to the SLD diagrams in Appendix A for additional information.

- Separation of the circuits in the main switchboard into
  - LOAD circuits that are backed up during an outage and,
  - Loads that are unsupported during an outage (e.g. pool heating, electric floor heating etc)

- Installation of the supplied double pole MCB breaker (1-phase) or 2 x 3-pole MCBs for the 3-phase installation, to isolate the Gecko2 system if work is being done in the switch board.

- 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 Gecko2 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)

SDM630MCT 40mA

DIN Rail Energy Meter for Single and Three Phase Electrical Systems

SDM120CT-M(40mA)

Single-Phase Multifunction DIN Rail Meter

Wires connected to RedEarth supplied feed-in meter (Easton), or directly into the inverter

100 Amp CT

ARROW pointing toward Gecko system
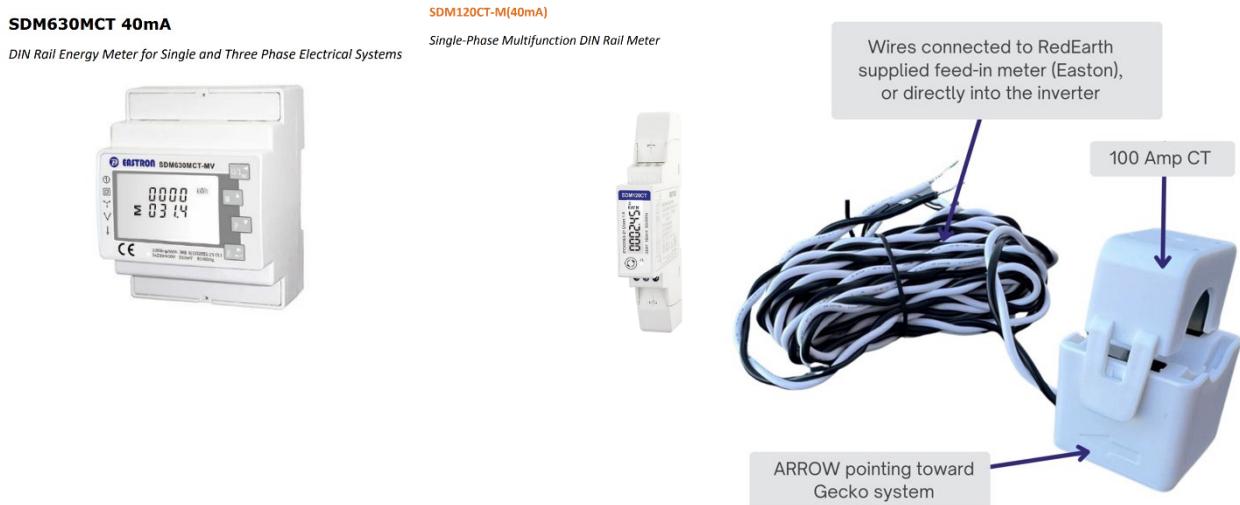
ℹ️ *Meter connection: Be sure to wire it into the side that turns off during a grid power outage and have the CTs clipped in between the Electricity Meter and the Main Circuit Breaker (with the ARROW pointing towards the Gecko2 system - see image).*

The communication cable from the feed-in meter to the Gecko2 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 Gecko2 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

EASTRON SDM230   Pic 7.1 EASTRON meter

Note:
When the inverter is in the off-grid state, the N line needs to be connected to the earth.
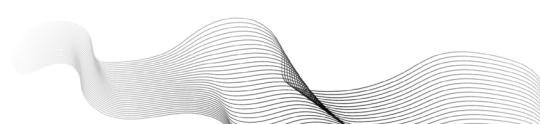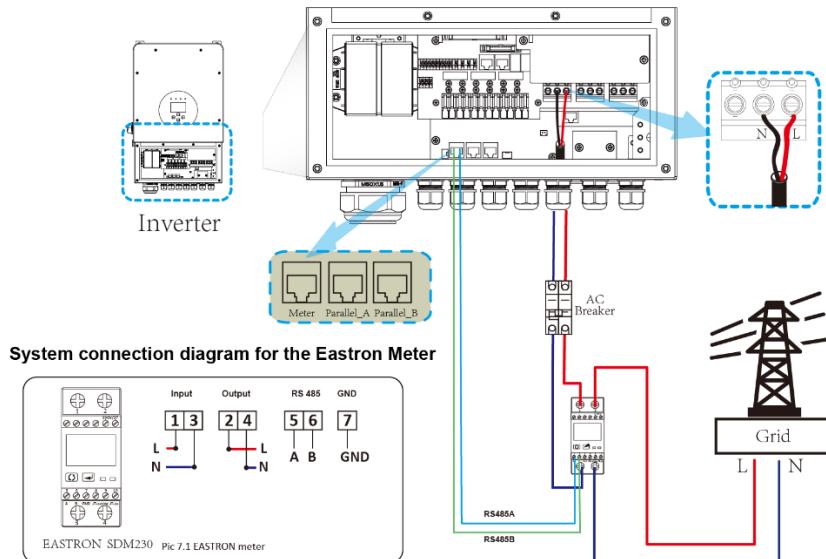
For ease of comprehension, install the Gecko2 system isolator (MCB) between the unsupported loads and the backed-up loads, as shown below. Then all the backed-up loads can be put on the right-side of the Gecko2 system isolator.

After the installation of the Gecko2, the Main Switchboard of the property should look something like this (1-phase example shown). The two key components related to the Gecko2 system are identified below:

- "BATTERY SYSTEM CIRCUIT BREAKER": Isolates the Gecko2 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).

- Gecko2 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 Gecko2 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 Gecko2 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 Gecko2 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 below, for example connection diagrams and SLDs:

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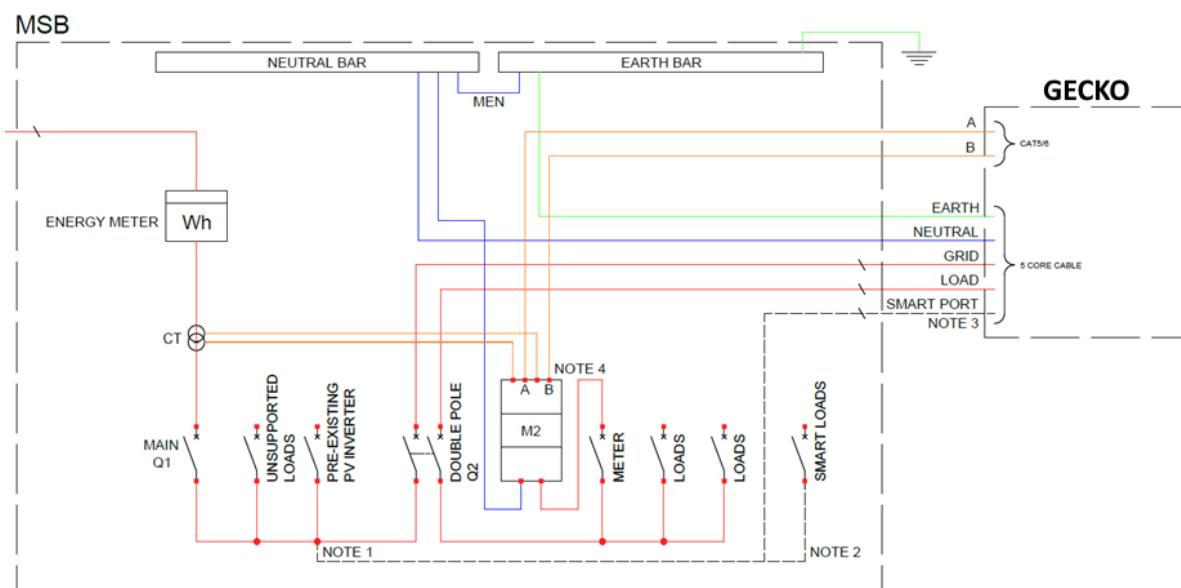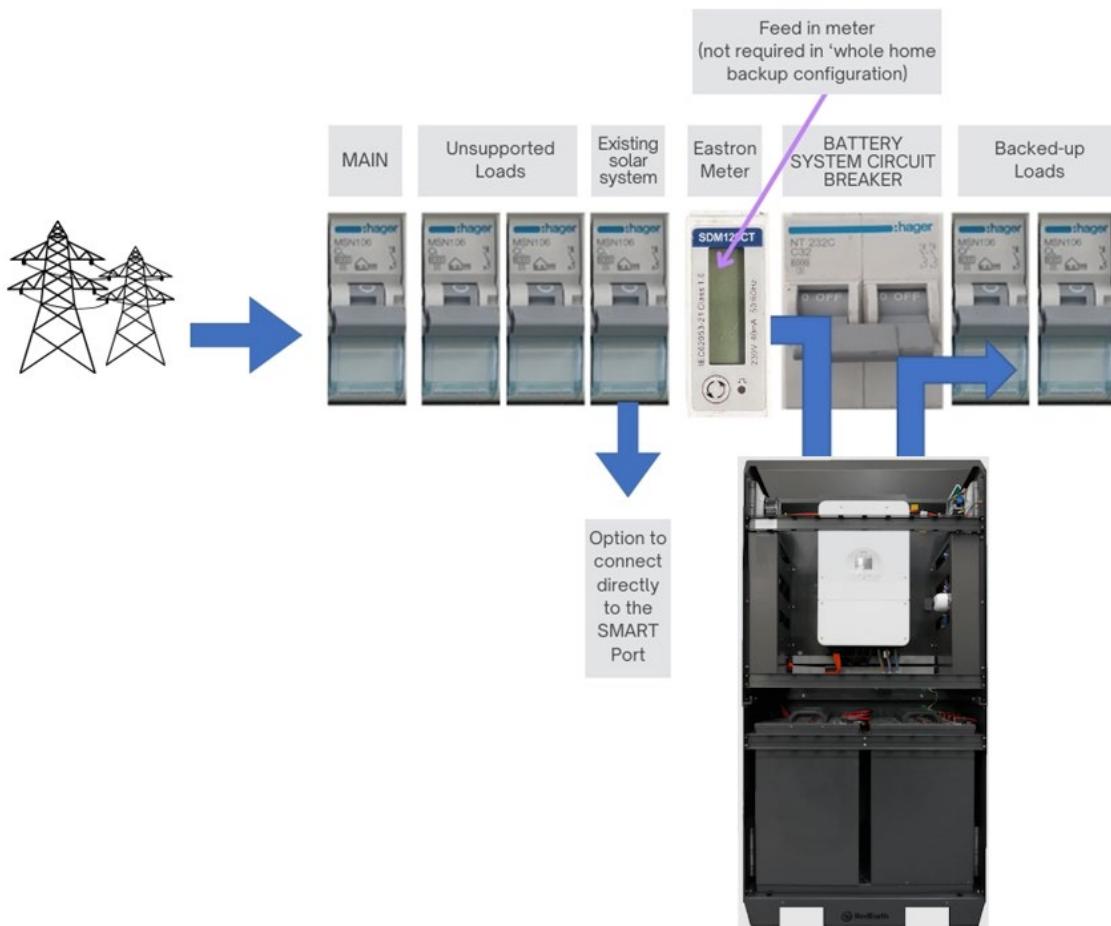
4.3 Earth Fault Alarm

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.

4.4 Solar Connection

The Gecko2 systems each have two or three (10kW) Maximum Power Point Trackers (MPPTs) The PV string configuration is explained previously in **"Step 3. Solar installation"**.
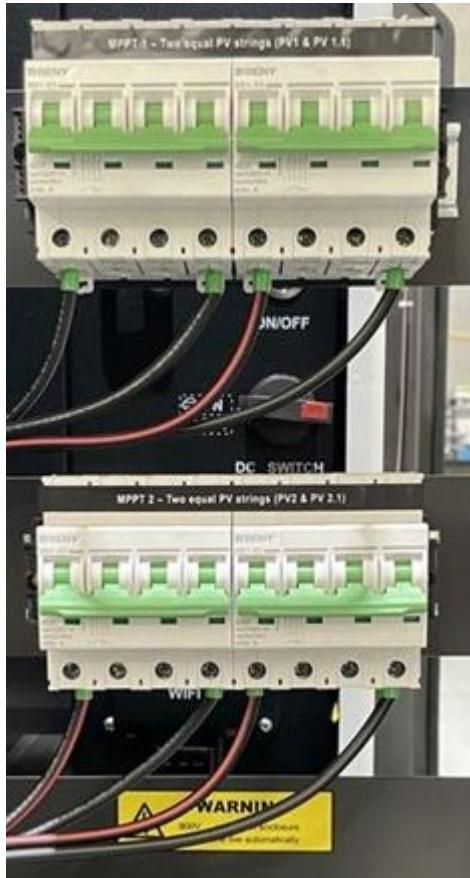
To connect the solar arrays, run the pairs of unterminated PV cables into the 25mm holes on the DC (left side) the side or rear of the Gecko2 (The glands provided in the parts kit are designed to seal around 25mm flexible conduit). Next check for correct polarity and V_{OC}, then terminate the cables 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.

4.5 Connecting the Gecko2 in an Off-Grid Installation

When connecting the Gecko2 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.

This means simply connect the loads to the LOAD terminal and the generator to the SMART Port (Smart / Gen) terminal.
To benefit from the auto-start feature the generator needs to be 2-wire auto-start capable. The two wires are then connected to the terminals inside the cabinet. These are located on the right side of the AC DIN rail.
If the generator is not auto-start capable then it must be manually started and stopped when the batteries depleted.

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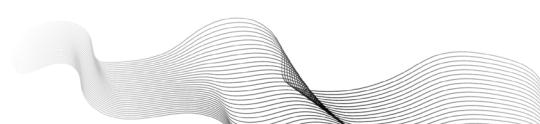
Step 5. Understanding the Turn ON/SHUTDOWN Procedure

Before starting up the Gecko2 confirm the following items have been completed:

- The PV cables have the correct polarity and are correctly connected to the MCBs provided, particularly any parallel strings going into the same MPPT.
- GRID, LOAD and SMART Port cables are securely connected. The system is correctly earthed, and a MEN link is in place in the switchboard.
- Proper weatherproof seals are installed on all cable entry glands of the Gecko2 System.
- The battery terminal connections on the BATTERY SYSTEM D.C. ISOLATOR MCCB are tight. (Check after transportation)
- 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) see **"Step 6. Commissioning the system"**

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

1. Switch ON all battery breakers on top of each Troppo Ultra battery

2. Switch ON the BATTERY SYSTEM D.C. ISOLATOR

3. Switch ON all the MCB SOLAR D.C. ISOLATORs. Also ensure the PV Isolator on the left-side of the inverter is in the ON position.

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

5. Ensure the Bypass switch is in the Normal Operation position (upwards = (I))

6. Turn ON all AC circuit breakers and wait for the system to start up (approx. 5 minutes)

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. Turn OFF all AC circuit breakers (#1). 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 the SOLAR D.C. ISOLATORS (#2). 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 (#3). It Is not necessary to turn off the individual battery breakers on each battery unless the system will be off for over three months.

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Step 6. Commissioning the System

The Gecko2 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 Gecko2 system, see image to the right.

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 the Gecko2 has been installed is weak or inconsistent. The extension 4G antenna (supplied in parts kit) can replace the pencil style 4G antenna. This extension 4G antenna can be placed in a location with better 4G signal. See image to the right.

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 Gecko2 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 Gecko2 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. Correct any faults that occur.**

Commissioning steps details are explained below.

6.1   Power up the Gecko2 System

Follow the procedure outlined in Step 5 "Understanding the Turn ON/Shutdown procedure" above.

6.2   Access the Inverter via the Inverter Screen

The Gecko2 has been commissioned and tested in RedEarth's factory.
Only minor parameter adjustments may be required.

These changes can be made via the Gecko2's inverter screen directly.

6.3   Confirm the Inverter Configuration (including regional settings)

1. Click the **System Setup** Icon on the top right to enter the settings.
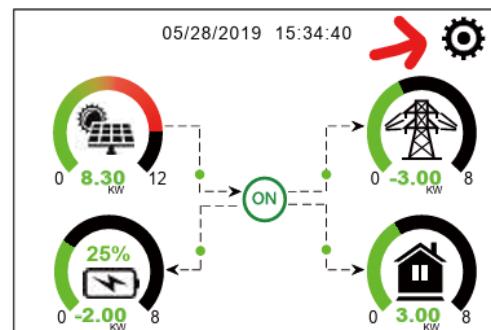
2. The inverter screen flowchart:

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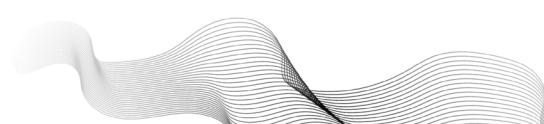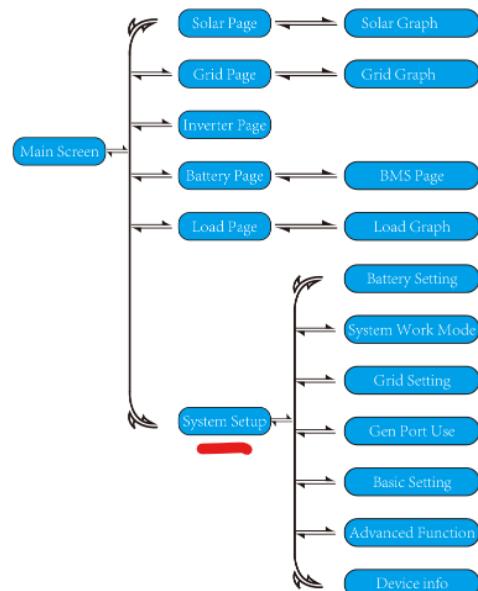
3. System Setup -> Grid Setting

Confirm the settings are suitable for the installation site, including Australia, A, B or C (for grid-connected systems). By selecting Australia A, B or C the power quality response mode and grid protection settings will be reset to the default values for Australia Region A, B, C respectively.
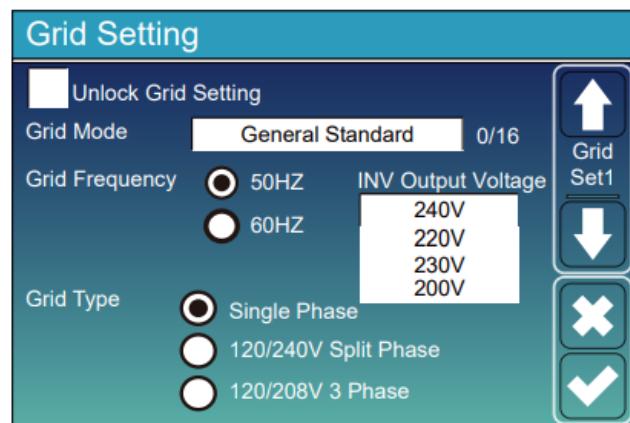
4. Battery Setting

The battery type should be set to 'Lithium', Battery Capacity should be set to number of Troppo Ultra batteries x 110Ah. Max A Charge should be set as follows:
- 5kW inverter – 120A
- 10kW inverter – 220A
- 12kW inverter – 240A
- 15kW inverter - 240A
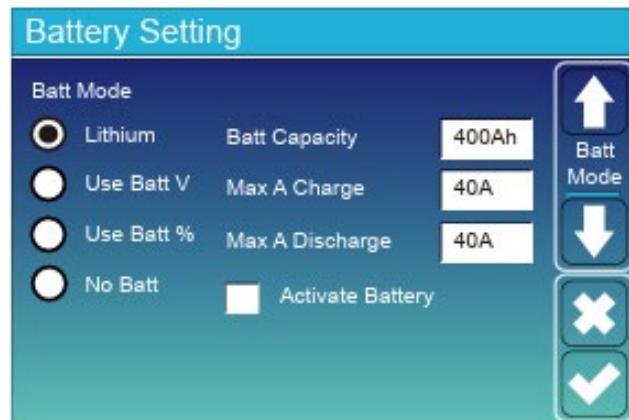
5. System Work Mode Settings

Set the following settings:
Max Solar Power should be set 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. Untick 'Grid Peak Shaving'.

6. System Work Mode-2

Leave with its default settings. These are:
Time of Use: ticked which enables the rest of the settings.
Grid Charge: Use the grid to charge the battery in this time period. This is ticked for on-grid systems.
Gen Charge: Use the generator to charge the battery in this time period. This is ticked for systems with generators connected (offgrid and hybrid systems).
Time: Start & Stop time period for which these settings are valid.

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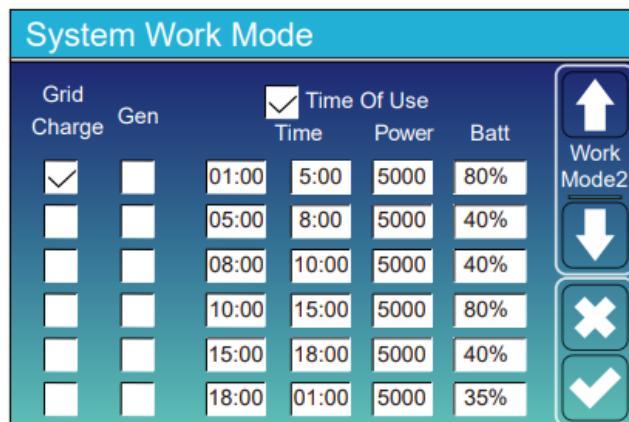
Power: Maximum discharge power from the battery allowed in that time period. Usually set to the battery capacity.
Batt (V or SOC%): when charging, the inverter will maintain the battery's voltage or SOC% at this level in this time period. Usually set to 20%.

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 5000W.

7. System Work Mode-4

All days should be ticked by default. This shows the days on which the 'Time of Use' settings are enabled.
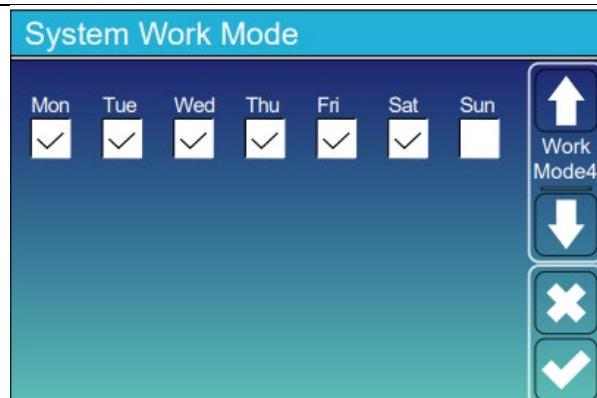
Adjusting Generator Charge Rate
This is usually only required if the Gecko2 is installed **off-grid.**
To adjust the generator limit you must adjust two parameters:

1. Adjust the **Power** in section System Work Mode-2, this will adjust how much the generator can be used to feed any loads if the battery is full.

2. In System Setup -> **Battery Setting**, tick "Gen Charge" and adjust the number of Amps "A" in which the generator will be allowed to charge the battery.
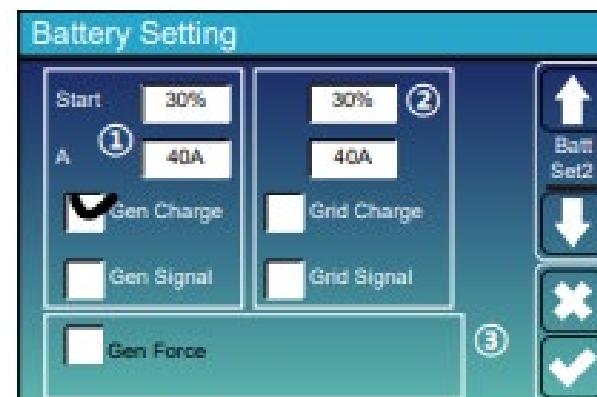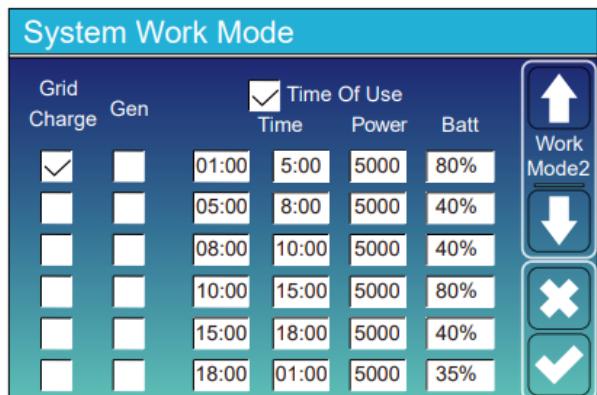
SMART PORT SETUP

(i) The generator input port (SMART Port) can be reconfigured as either a smart load output port or as an AC-coupled renewable energy input port.

1. Navigate to System Setup -> Gen Port Use

Setting the Smart port to **Smart Load Output (e.g., to connect an air-conditioner)**
To convert the generator port to a smart load output (disabling generator functionality), select 'SmartLoad Output' radio button.
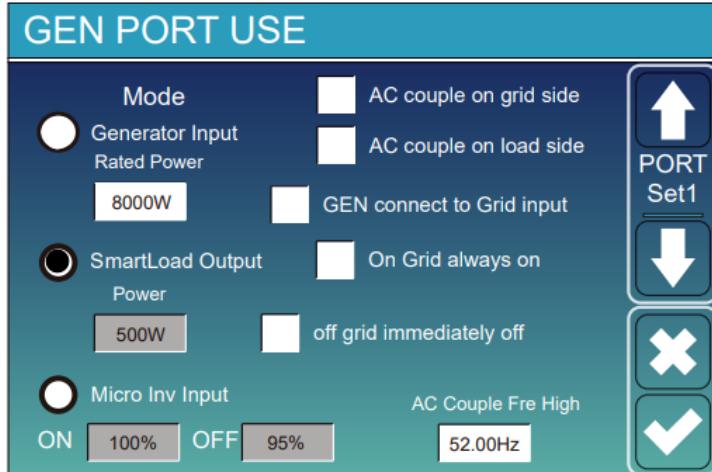
For the Smart Load Output, there are several simple parameters to tune it to the customers' requirements:

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:
Clicking "on Grid always on" activates the smart load when the grid is present.

For example, in the image above, Power=500W, ON:100%, OFF:95%, says that when the PV Power exceeds 500W, 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 500W, 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 (e.g. to connect an extra or existing PV inverter)
To convert the generator port (SMART Port) to a smart load output (disabling generator functionality), select the "Micro Inv Input" radio button.
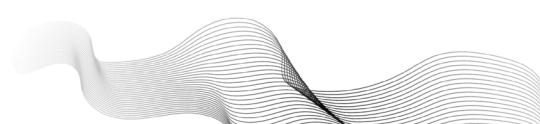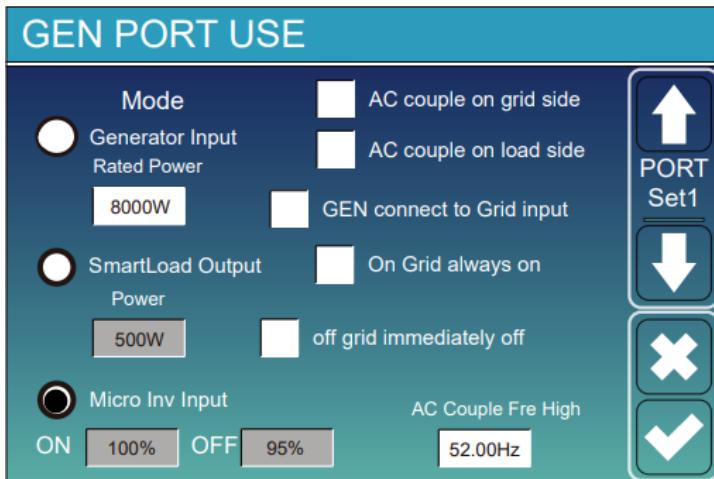
There are some simple parameters to tune the AC-coupled renewables input port to your customer's requirements:

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 chosen, 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 Gecko2 settings must be done by a trained/qualified person. If in doubt, contact RedEarth Support

6.4   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 Gecko2 is generating PV, charging the batteries, and supplying the loads.

- also, that the Bypass switch works, by physically switching to Bypass mode and confirming the operation.

- also, confirm 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)

6.4.1   Normal Operation

In this operation mode the Gecko2 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).
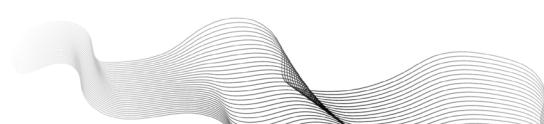
6.4.2 Bypass Operation

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

6.4.3 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.
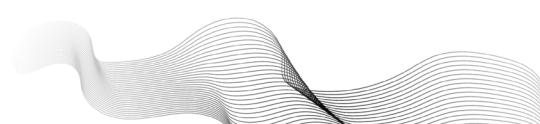
1.5 Gecko2 (Deye Inverter) Fault Codes

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 us 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 us, 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.

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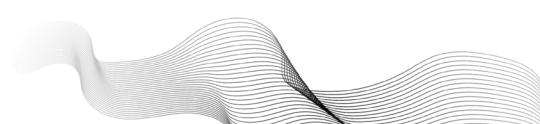
F42	AC line low voltage	Grid voltage fault 1. Check the AC voltage is in the range of standard voltage in specification; 2. Check whether grid AC cables are firmly and correctly connected; 3. Seek help from us, if cannot go back to normal state.
F47	AC over frequency	Grid frequency out of range 1. Check 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.
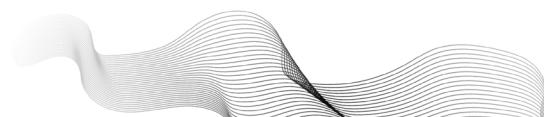
Step 7. Activating Remote Monitoring and Communications

The Gecko2 system is supplied with RedEarth's monitoring device (RUT) for remote monitoring and control.

There are currently three options to connect the **monitoring device (RUT)** to the internet to enable remote access to the Gecko2.

Note: All of these require the customer to first scan the QR code on the outside of the Gecko2 system and register their system.
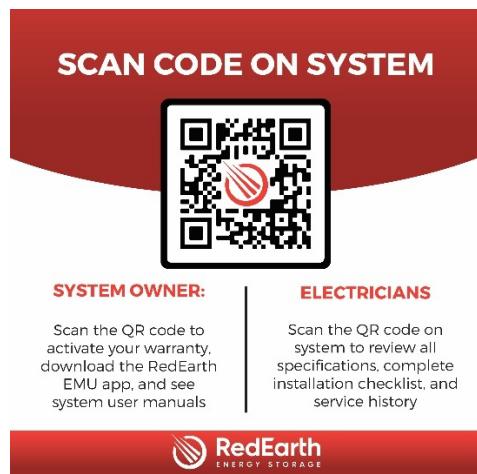
1. Use RedEarth's supplied 4G monitoring that is included inside the RUT.

   o Note that this option is active for the first 3 months after installation, after which it will remain active if the customer joins RedEarth's **Optimum** Support program.

   o If the customer chooses not to join Optimum, then they will need to provide their own internet if they wish to continue monitoring their system. The two options below are available to achieve this.

2. Connect the RUT to the customer's Wi-Fi (signal strength dependent)

3. Hardwire the RUT to the customer's LAN. This is the most reliable option of the three.

The RUT with 4G option requires positioning the Gecko2 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, otherwise replace the screw in pencil style 4G antenna on the top right side of the unit with the extension 4G antenna position the supplied in the parts kit. This will allow for more flexible antenna locations. As shown in **"Step 6. Commissioning the system"**

Remote monitoring and control are then available via RedEarth's EMU APP once the customer completes registration by scanning the QR code and filling in their details. This also registers their warranty.
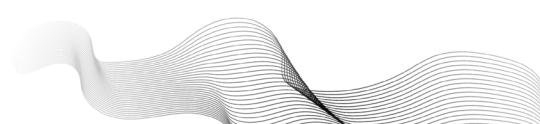
Step 8: Customer Handover

Handover to Customer Checklist:

1. Have the customer scan the QR code and register their system. This allows them to monitor their system once they have downloaded the RedEarth EMU app. It also registers their warranty.

2. Confirm that the customer has downloaded the RedEarth EMU APP and is logged-in, otherwise provide the customer's contact details to RedEarth to complete onboarding the customer at a later date.

3. Explain to the customer how the system operates and demonstrate what happens during a power outage, by turning off the Main grid breaker to the house and observing the Backup operation. (for on-grid installations) Confirm that the correct circuits are supported. (**Note:** that there may be a short delay before the Backup circuits activate after the grid is disconnected from the home).

4. Demonstrate the operation and effect of the Bypass switch, which isolates the battery from the customer's home.

5. Show the customer the isolation switches for the Gecko2 which you have installed in the homes Main Switchboard (MSB).

6. Show the customer how to remove and clean/replace the filters, which is required for warranty upkeep. (all 6 filters total)

7. Obtain any customer signatures required for claiming STCs

8. Confirm that the customer has scanned the QR code and entered their details. Without doing this it is difficult for RedEarth to provide technical support, and the installer will be required to provide all support.
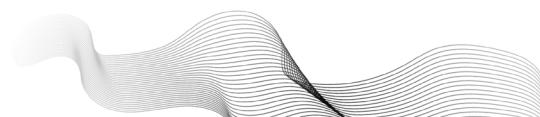
Services and options available for your Gecko2

Options for your Gecko2

RedEarth can provide several options and upgrades for the Gecko2 system.

- Additional Troppo Ultra batteries - up to a maximum of eight for the Gecko2 (44.8kWh nominal)
- V2G – Vehicle to Grid - from your EV to your Gecko2 system to the grid with RedEarth's Boomerang V2G EV charger
- Combining Gecko2s - using RedEarth's AC combiner to not only double battery capacity but also double inverter power.

Services for your Gecko2

As a RedEarth Gecko2 system owner you have the choice of joining our customer community.
You just need to sign up to our **Optimum** Support service via the EMU app that you use to monitor your system.
Once you are registered in Optimum you will receive the following benefits;

- Access to RedEarth's 4G monitoring service if required (on-grid or off-grid)

- Contact us and we'll review your current electricity provider and provide recommendations for better offers in the market. Our customers have saved $150-$200 per year on average. (if you are on-grid)

- Access to RedEarth's PPP (Private Power Plant) and the stream of financial benefits available to you, including energy trading (if suitable for your circumstances) Peer-to-peer trading, smart EV charging, Power Ranger (A remote for your battery), etc. These services can be controlled from RedEarth's EMU app.

- Purchase additional Troppo Ultra batteries for system expansion as required, for example if you purchase an electric vehicle.

- You also receive regular relevant communications from RedEarth. For example, information on government rebates.
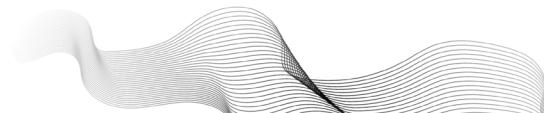
Technical support & warranty claims

Technical Support

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 AEST across Australia**.

If you require assistance outside of these hours, please make arrangements with our friendly tech support staff.

Customer support and warranty claims

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 a problem with your system, please follow the steps below:

1. **Contact your certified installer or authorised reseller**
    If you are experiencing any issues with your RedEarth system, your first point of contact should be your installer or authorised reseller who sold you your RedEarth System.

2. **Contact RedEarth**
    If you did not purchase your RedEarth **s**ystem from a certified installer or an authorised reseller, or if you purchased it directly from RedEarth, you should contact RedEarth by going to **our website** and click on the **"Raise a ticket"** button in our site header.

    You will need to include:
    *   Proof of original purchase of your battery system from RedEarth, a certified installer or an authorised reseller**.**
    *   Your RedEarth System serial number.
    *   Your name and the date and location of original installation.
    *   The name and contact details of the authorised installer who installed your RedEarth System.

3. **Next steps**
    Your support ticket will be logged. RedEarth will first endeavour to diagnose and repair your system remotely. If necessary RedEarth may require a technician to repair the system on-site.

RedEarth
ENERGY STORAGE
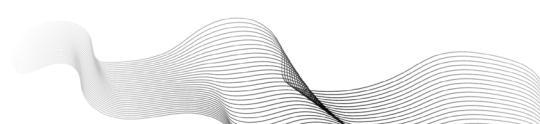
Appendix A - Single Line Diagrams

SLD—Power AC & DC (1-phase and 3-phase versions)

Issue date: 18/12/2025. Version 1.0
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FOR REFERENCE

P0121 - RED-GENE-300-R1 — Gecko V2 Single Phase 5, 8, 10 kW Overall Schematic

APPLIES TO INVERTER MODELS

MODEL	OUTPUT POWER	NO PHASES
SUN-5K-SG04LP1-AU	5 kVA	1
SUN-8K-SG04LP1-AU	8 kVA	1
SUN-10K-SG02LP1-AU-AM3	10 kVA	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

SWITCHGEAR SPECIFICATIONS

DESCRIPTION	Q1 GRID PORT 2P AC MCB	Q2 LOAD PORT 2P AC MCB	Q3 SMART PORT 2P AC MCB	K1 BYPASS SWITCH	Q4 FAN AND GPO 1P RCBO T/A	PV ISO(1-4) PV1 INPUT 4P MCB	BESS CB BATTERY CB 2P MCB
TYPE							
SUN-5K-SG04LP1-AU	40	40	40	63	10	40	100/180*
SUN-8K-SG04LP1-AU	50	50	50	63	10	40	250
SUN-10K-SG02LP1-AU-AM3	50	50	50	63	10	40	250

*5 kVA INVERTER MODEL HAS 2 X BESS CB OPTIONS 125/160 (tr≥0.8) OR 125/180 (tr<0.7).

BATTERY MODULE SPECIFICATIONS

	Troppo 4841	Redearth
MANUFACTURER		
MODEL	TROPPO 4841	TROPPO ULTRA
CHEMISTRY	LiFePO4	LiFePO4
NOMINAL VOLTAGE	51.2 VDC	51.2 VDC
NOMINAL ENERGY	4.1 kWh kWh	5.6 kWh
AH CAPACITY	79.8 Ah	110 Ah
INTEGRATED MCB	63 A	100 A

CABLE SPECIFICATIONS

CABLE	SPECIFICATION (SIZE mm²)	SPEC	INSTALLATION METHOD	CURRENT CAPACITY (A)
GRID PORT SUB MAIN	2x1C HF CuPVC	Cu(Flex)/PVC	UNENCLOSED	54
LOAD PORT SUB MAIN	2C HF CuPVC	Cu(Flex)/PVC	UNENCLOSED	54
SMART PORT SUB MAIN	2C HF CuPVC	Cu(Flex)/PVC	UNENCLOSED	54
MAIN (BATTERY) SUB MAIN	2 x 1C	Cu(Rev)/X-110	UNENCLOSED	279/136*
BATTERY MODULE SUB MAIN	2 x 1C	Cu(Rev)/X-110	UNENCLOSED	105
PV CABLES	4	Cu(Rev)/X-110	UNENCLOSED	45
EARTH	1C	Cu/PVC	UNENCLOSED	N/A

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

INVERTER SPECIFICATIONS

MANUFACTURER		DEYE	
MODEL	SUN-5K-SG04LP1-AU	SUN-8K-SG04LP1-AU	SUN-10K-SG02LP1-AU-AM3
OUTPUT POWER	5kVA	8 kVA	10 kVA
NO MPPTs	2	2	3
INPUTS PER MPPT	1/1	2/2	3/2/2
MAX INPUT VOLTAGE	500V		
MAX SHORT CCT CURRENT	18.5A+18.5A	36A+36A	44A+44A+44A
MAX OPERATING CURRENT	13A+13A	26A+26A	26A+26A+26A
RATED VOLTAGE	40-60V DC		
MAX CHARGE CURRENT	190A	190A	220A
MAX DISCHARGE CURRENT	120A		220A

*FOR ACTUAL GECKO PV DC ISOLATION ARRANGEMENTS FOR EACH INVERTER MODEL REFER TO DRAWING 301

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 v2 dc isolation arrangements.
7. Based on maximum pass through current for each inverter model. Refer to datasheet and/or sizing of outgoing AC cables.

REVISION REGISTER:

REV	NOTE	DRWN	CHCKD	DATE
R1	For Reference	RM	EG	28/10/25

PROJECT NAME: Redearth Standard Drawings
ADDRESS: N/A N/A
SCALE: NTS
PAGE SIZE: A3
SHEET: 1 of 1
DRAWING TITLE: Gecko V2 Single Phase 5, 8, 10 kW Overall Schematic
DRAWING NUMBER: P0121 - RED-GENE-300-R1

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Schematic labels: DC DISTRIBUTION SECTION, INVERTER SECTION, AC DISTRIBUTION SECTION, BATTERY CABINET, INVERTER MAKE: DEYE MODEL: SEE TABLE, PV ISOLATION 3 X 4P 63A 1200V MCB, GRID PORT, LOAD PORT, SMART PORT, GEN AUTO-START, BATTERY IN, BAT TEMP SENSOR, DC BUSBAR +VE, DC BUSBAR -VE, BESS MAIN CIRCUIT BREAKER 2P 250V DC MCB, BATTERY MODULE 1 TROPPO 4.1 kWh /TROPPO ULTRA 5.6 kWh, BATTERY MODULE X, REDEARTH REMOTE MONITORING, THERMAL RELAY, 10A GPO, TO AC SOURCE, TO AC LOAD, TO GENERATOR/ UNCONTROLLABLE LOAD /AC COUPLED SOLAR, TO GENERATOR 2 WIRE AUTO-START (IF PRESENT)

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CLIENT:

PROJECT NAME:
Redearth Standard Drawings

ADDRESS:
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N/A

DRAWING TITLE:
Gecko V2 - 3 Phase
DC Isolation Arrangements

DRAWING NUMBER:
P0121 -RED-GENE303 -R1

SCALE: NTS

PAGE SIZE: A3

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 AS35033.

REVISION REGISTER:

FOR REFERENCE

REV	NOTE	DRWN	CHKD	DATE
R1	For Reference	RM	--	4/11/25

APPLIES TO INVERTER MODELS

MODEL	OUTPUT POWER	NO PHASES
SUN-12K-SG04LP3-AU	12 kVA	3
SUN-15K-SG05LP3-AU-SM2	15 kVA	3

SUN-12K-SG04LP3-AU

4 mm² 2 x 1C
Solar Cable
Cu/Flex/X-110
IEC62930 compliant

PV ISOALATION
3 X 4P 40A 1200V
MCB

INVERTER
MAKE: DEYE
MODEL: SUN-12K-SG04LP3-AU
12 kVA 3 PHASE INVERTER

PV1.1
PV1.2
PV2.1

SUN-15K-SG05LP3-AU-SM2

4 mm² 2 x 1C
SOLAR CABLE
Cu/Flex/X-110
IEC62930 COMPLIANT

PV ISOALATION
4 X 4P 40A 1200V
MCB

INVERTER
MAKE: DEYE
MODEL: SUN-15K-SG05LP3-AU-SM2
15 kVA SINGLE PHASE INVERTER

PV1.1
PV1.2
PV2.1
PV2.2

DC ISOLATION ARRANGEMENT FOR INVERTER MODELS

INVERTER SPECIFICATIONS

MODEL	NO MPPTS	INPUTS PER MPPT	TOTAL PV INPUTS
SUN-12K-SG04LP3-AU	2	2+1	3
SUN-15K-SG05LP3-AU-SM2	2	2+2	4

DC ISOLATOR SPECIFICATIONS

MAKE	MODEL	4P RATING VOLTAGE	4P RATING CURRENT	2P RATING VOLTAGE	2P RATING CURRENT
ZJBENY	BB1-63	1200V	40A	600V	40A

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AC DISTRIBUTION SECTION

- TO AC SOURCE
- TO AC LOAD
- TO GENERATOR/ UNCONTROLLABLE LOAD
- AC COUPLED SOLAR
- TO GENERATOR 2 WIRE AUTOSTART (IF PRESENT)
- Q1 4P MCB – SEE Q1 TABLE FOR RATINGS
- Q2 3P MCB
- Q4 1P-10A RCBO
- Q3 4P MCB – SEE TABLE FOR RATINGS
- TB1-2 / TB1-1
- REDEARTH REMOTE MONITORING
- 10A GPO
- THERMAL RELAY
- F2 / F1
- 1.5 mm² 2C-E CuPVC/PVC (V-90V-90)
- 10 mm² 2 × C CuPVC/PVC (V-90V-90)
- K1 4P-63A MTS
- 4 mm² HC CuPVC GREEN/YELLOW EARTH

INVERTER SECTION

- GRID PORT
- LOAD PORT
- SMART PORT
- GEN AUTO-START
- INVERTER MAKE: DEYE MODEL: SEE TABLE. RATED POWER & PHASES: SEE INVERTER OPTIONS TABLE
- BESS MAIN CIRCUIT BREAKER 2P 250V DC MCCB SEE TABLE FOR RATINGS
- BATTERY IN SEE NOTE 8
- BATT TEMP SENSOR
- 2 × 1C CuFlex/X-F-110 (X-110) SEE TABLE FOR SIZING

DC DISTRIBUTION SECTION

- 4 mm² 2 × 1C SOLAR CABLE CuFlex/X-110 MCB IEC62930 COMPLIANT
- PV ISOLATION 4 × 4P 40A 1500V MCB SEE NOTE 6
- CABLE AND TEMPERATURE PROBE SUPPLIED WITH INVERTER
- 16 mm² 2 × 1C CuFlex/X-110 (X-110) <1m
- PV1.1 / PV1.2 / PV2.1 / PV2.2

BATTERY CABINET

- BATTERY MODULE X REFER TO TABLE
- BATTERY MODULE X INTEGRATED 2P MCB SEE TABLE / TROPPO ULTRA 5.6 kWh REFER TO SPECIFICATION TABLES FOR DETAILS
- BATTERY MODULE 1 REFER TO TABLE
- BATTERY MODULE 1 INTEGRATED 2P MCB SEE TABLE / TROPPO ULTRA 5.6 kWh REFER TO SPECIFICATION TABLES FOR DETAILS
- FOR MAXIMUM NUMBER OF BATTERIES CONNECTED IN PARALLEL FOR EACH MODEL, REFER TO TABLE
- DC BUSBAR -VE / DC BUSBAR +VE

APPLIES TO INVERTER MODELS

MODEL	OUTPUT POWER	NO PHASES
SUN-12K300JLP3-AU	12 kVA	3
SUN-15K300JLP3-AU-SM2	15 kVA	3

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

SWITCHGEAR SPECIFICATIONS

		Q1 GRID PORT 4P MCB	Q2 LOAD PORT 3P MCB	K1 SMART PORT 4P MCB	D4 GEN/REG SWITCH 1P MCB	FAN ANA GPO PV IN 1/A
RATED		50	50	50	10	10
CURRENT PER INVERTER	SUN-12K300JLP3-AU	50	50	50	10	10
	SUN-15K300JLP3-AU-SM2	50	50	63	10	40

BATTERY MODULE SPECIFICATIONS

	SUN-12K300JLP3-AU	SUN-15K300JLP3-AU-SM2
MANUFACTURER	Troppo 4841 Troppo ULTRA	Redearth
MODEL	TROPPO 4841 TROPPO ULTRA	LIPO4
CHEMISTRY	Redearth	LIPO4
NOMINAL VOLTAGE	51.2 VDC	51.2 VDC
NOMINAL ENERGY	4.1 kWh KWH	5.6 kWh
Ah CAPACITY	79.8 Ah	110 A
INTEGRATED MCB	63 A	100 A

CABLE SPECIFICATIONS

CABLE	SPECIFICATION	SIZE (mm²)	SPEC	INSTALLATION METHOD	CURRENT CAPACITY (A)
GRID PORT SUB-MAIN	4 × 1C	10	Cu FLEX/PVC	UNENCLOSED	54
LOAD PORT SUB-MAIN	4 × 1C	10	Cu FLEX/PVC	UNENCLOSED	54
SMART PORT SUB-MAIN	4 × 1C	10	Cu FLEX/PVC	UNENCLOSED	54
MAIN BATTERY MCCB-INVERTER	2 × 1C/2 × 2 × 1C	70/2 × 25	Cu FLEX/X-110	UNENCLOSED	279/2 × 78*
BATTERY MODULES SUB-MAIN	2 × 1C	16	Cu FLEX/X-110	UNENCLOSED	105
PV CABLES	2 × 1C	4	Cu FLEX/X-110	UNENCLOSED	45
EARTH	1C		Cu PVC	UNENCLOSED	N/A

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

INVERTER SPECIFICATIONS

		SUN-12K300JLP3-AU	SUN-15K300JLP3-AU-SM2
	MANUFACTURER	DEYE	
AC SIDE	MODEL	SUN-12K300JLP3-AU	SUN-15K300JLP3-AU-SM2
	OUTPUT POWER	12 kVA	15 kVA
	NO MPPT's	2	2
PV	INPUTS PER MPPT	2/1	2/2
	MAX INPUT VOLTAGE	600V**	600V**
	MAX SHORT CCT CURRENT	30A+19.5A	54A+54A
	MAX OPERATING CURRENT	26A+13A	30A+19A
	NO. INPUTS	1	2
BATTERY INPUT	RATED VOLTAGE	48-60V/DC	48-60V/DC
	MAX CHARGE CURRENT	240A	240A
	MAX DISCHARGE CURRENT	250/260A*	250/260A*

*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

NOTES:

1. All installation works shall comply with: AS/NZS 3000, AS/NZS 3008, AS5033, AS4777, AS5139, CEC Guidelines, Supply Authority Services & Installation Rules and local authority guidelines.
2. PV cables shall comply with IEC62930 as per AS5033.
3. Battery DC charging 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 arrangements shown is for SUN-15K-S025LP3-AU-SM2 (15 Kva), For all inverter isolation arrangements refer to drawing 301 - gecko v2 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.

REVISION REGISTER:

FOR REFERENCE

REV	NOTE	DRWN	CHCKD	DATE
R1	For Reference	RM	EG	28/10/25

PROJECT NAME: Redearth Standard Drawings
ADDRESS: N/A, N/A
DRAWING TITLE: Gecko V2 - 3 Phase 12,15 Overall Schematic
DRAWING NUMBER: P0121-RED-GENE300-R1
SCALE: NTS
PAGE SIZE: A3
SHEET: 1 of 1

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SLD—Communications (1-phase and 3-phase are the same)

COMMUNICATIONS DIAGRAM

GECKO

NOTES
1. Meter comms only required when there are unsupported loads present.
2. Generator 2 wire auto-start only required when generator is auto-start capable.

DEYE INVERTER

48 Vdc

ANTENNA

RedEarth Remote Monitoring

METER COMMS, CAT5/6 — NOTE 1
GEN - Auto-Start, 2 CORE — NOTE 2

OPTIONAL WIRED INTERNET, CAT5/6

INVERTER COMMS, CAT5

REV		BY	DATE	REVISION DETAILS
E	LOAD POWERED INDICATOR INCLUDED. WIFI COMMS REPLACED WITH LAN	TK	05/07/23	
D	3PH BREAKER SIZING ADJUSTED	TK	03/06/23	
C	Q1 UPDATED TO ACCOMMODATE GENERATOR	TK	04/04/23	
B	Q7 CONNECTION POINT CHANGED	TK	12/12/23	
A	INITIAL ISSUE	TK	08/12/23	

	BY	DATE
DRAWN	TK	08/12/23
CHECKED	DP	08/12/23
APPROVED	CW	08/12/23

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REV E
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PAGE 4

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SLD—Main Switchboard (1-phase and 3-phase versions)

NOTES

1. Connecting a pre-existing PV inverter to the SMART port allows frequency shift control from the BushChook.

2. Smart Loads can be connected to the SMART port to allow load shedding.

3. SMART port is only capable of operating in one mode at a time, either AC solar input, smart load output or generator input.

4. Feed-in meter & CT's only required when there are unsupported loads present.

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1PH MSB WIRING EXAMPLE

SCALE AT A3: N.T.S

REV E

REV		BY	DATE	REVISION DETAILS
E	LOAD POWERED INDICATOR INCLUDED, WIFI COMMS REPLACED WITH LAN	TK	05/07/23	
D	3PH BREAKER SIZING ADJUSTED	TK	05/06/23	
C	Q2 UPDATED TO ACCOMMODATE GENERATOR	TK	04/04/23	
B	Q7 CONNECTION POINT CHANGED	TK	12/12/23	
A	INITIAL ISSUE	TK	08/12/23	

	BY	DATE
DRAWN	TK	08/12/23
CHECKED	DP	08/12/23
APPROVED	CW	08/12/23

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NOTES

1. Connecting a pre-existing PV inverter to the SMART port allows frequency shift control from the BushChook.

2. Smart Loads can be connected to the SMART port to allow load shedding.

3. SMART port is only capable of operating in one mode at a time, either AC solar input, smart load output or generator input.

4. Feed-in meter & CT's only required when there are unsupported loads present.

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3PH MSB WIRING EXAMPLE

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REV				BY	DATE
E	LOAD POWERED INDICATOR INCLUDED, WIFI COMMS REPLACED WITH LAN			TK	05/07/23
D	3PH BREAKER SIZING ADJUSTED			TK	03/06/23
C	Q2 UPDATED TO ACCOMODATE GENERATOR			TK	04/04/23
B	Q2 CONNECTION POINT CHANGED			TK	12/12/23
A	INITIAL ISSUE			TK	08/12/23
REV	REVISION DETAILS			BY	DATE

	BY	DATE
DRAWN	TK	08/12/23
CHECKED	DP	08/12/23
APPROVED	CW	08/12/23

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SCALE AT A3: N.T.S

REV E   PAGE 6

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Appendix B

Technical Specifications - Gecko2 systems

	Single phase		Three phase	
Gecko2 Model	**Gecko2 5kW** 2GC1-DY5-XUL	**Gecko2 10kW** 2GC1-DY10-XUL	**Gecko2 12kW** 2GC3-DY12-XUL	**Gecko2 15kW** 2GC3-DY15-XUL ~ *Coming soon*
Battery capacity (Troppo Ultra 5.6kWh)	2 to 8	2 to 8	3 to 8	3 to 8
Battery capacity (kWh nominal)	11.2 – 44.8	11.2 – 44.8	16.8 – 44.8	16.8 – 44.8
Inverter model	5K-SG04LP1-AU	10KSG02LP1-AU	12K-SG04LP3-AU	*~Coming soon*

Battery data

Battery type	Troppo Ultra 5156 LFP self-managed lithium			
Battery capacity (nominal)	5.6kWh per Troppo Ultra battery			
Battery operating voltage range (V)	48-57.6V			
Maximum charging current (A)	120A	220A	240A	280A
Maximum discharging current (A)	120A	220A	240A	280A

PV string input data

Maximum allowable PV (W)	10,000W	20,000W	24,000W	30,000W
Maximum usable PV (W)	7,500W	15,000W	18,000W	24,000W
Maximum PV input voltage (V)	500V	500V	600V	600V
MPPT range (V)	150 to 425V	150 to 425V	200V to 650V	160-650V
Start-up voltage (V)	125V	125V	160V	160V
PV input current (A)	13A+13A	26A+26A+26A	26A+13A	36A+36A
Maximum. PV Isc (A)	19.5A+19.5A	44A+44A+44A	39A+19.5A	54A+54A
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	9999	12,000	15,000
Maximum. AC input/output apparent power (VA)	5,000	9999	12,000	15,000
Peak power (off-grid)	2 times of rated power, 10 S			
Rated AC input/output current (A)	21.7A	43.5	17.4A	21.8
Maximum AC input/output current (A)	21.7A	43.5	17.4A	21.8
Maximum continuous AC passthrough (A)	35A	50A	45A	50A
Generator Total Harmonic Distortion (THDi)	<3% (of nominal power)			

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E N E R G Y   S T O R A G E
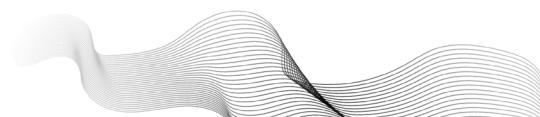
Power factor	0.8 leading to 0.8 lagging
Output frequency and voltage	50Hz; 230V/400V, 240/415V

Protection

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 III

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 Gecko2 system (excl. batteries) (kg)	100kg	120kg	125kg	140kg
Size of Gecko2 system (mm)	1060W x 1950H x 450D			
Protection degree of Gecko2 system	IP43			
RedEarth Warranty	10 years (AU & NZ and South Pacific region)			
Electrical connections	Grid connection, backup circuits connection and Smart Port connection (AC coupled inverter/smart load/generator). PV array			
Monitoring	Monitoring hardware included and activated via RedEarth's EMU app (subject to network availability and Optimum subscription).			
Energy trading	On-grid only			
EV charging	Yes			

* The Gecko2 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 Gecko2 system. The model numbers reflect the total battery capacity installed in the system.

Power yourself.