RedEarth
ENERGY STORAGE

Gecko

Installation and Operation Manual

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

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

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

Fast Installs

One Pallet

Plug 'n' Play

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

Safety instructions

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

General safety notes

FIRE

The Gecko uses RedEarth's Troppo ULTRA batteries. This is a lithium-iron-phosphate based battery (LFP). It is the safest lithium chemistry.

However, in the unlikely event of a fire, or if the unit emits smoke, sparks, flames, or vapour, produces a burning smell, becomes excessively hot or swells, leaks, or makes unusual noises,

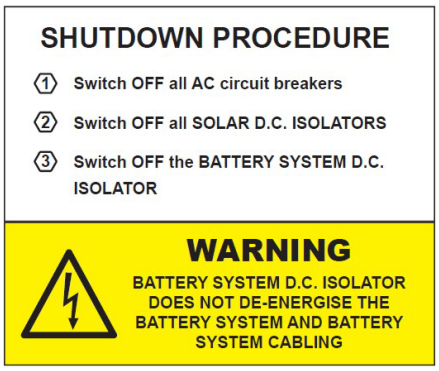
IMMEDIATELY:

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

Battery fires can reignite and may release toxic and flammable gases. Always prioritise personal safety.

Note: The Safety Data Sheet for the Troppo ULTRA battery must be left with the Main SwitchBoard for the fire brigade. The Safety Data Sheet can also be found at https://redearth.energy/troppo-ultra-safety-data-sheet/

- The Gecko must only be installed by suitably qualified personnel who have read the installation manual and are familiar with its operation and hazards. Working on the inside of the Gecko system is restricted to qualified personnel.
- The batteries provided with this system must only be charged by the inverter. Do not attempt to charge the batteries with any other charging device or connect any devices directly to the DC battery bus unless approved by RedEarth.
- Do not use a damaged battery.
- Batteries should only be disposed of at an appropriate recycling centre. Contact RedEarth for advice.
- The shutdown procedure can be found on the label on the right-hand side of the Gecko. More details in Step 5 of the Installation manual and in the User guide.



Installation safety notes

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

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

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

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

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Overview

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

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

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

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

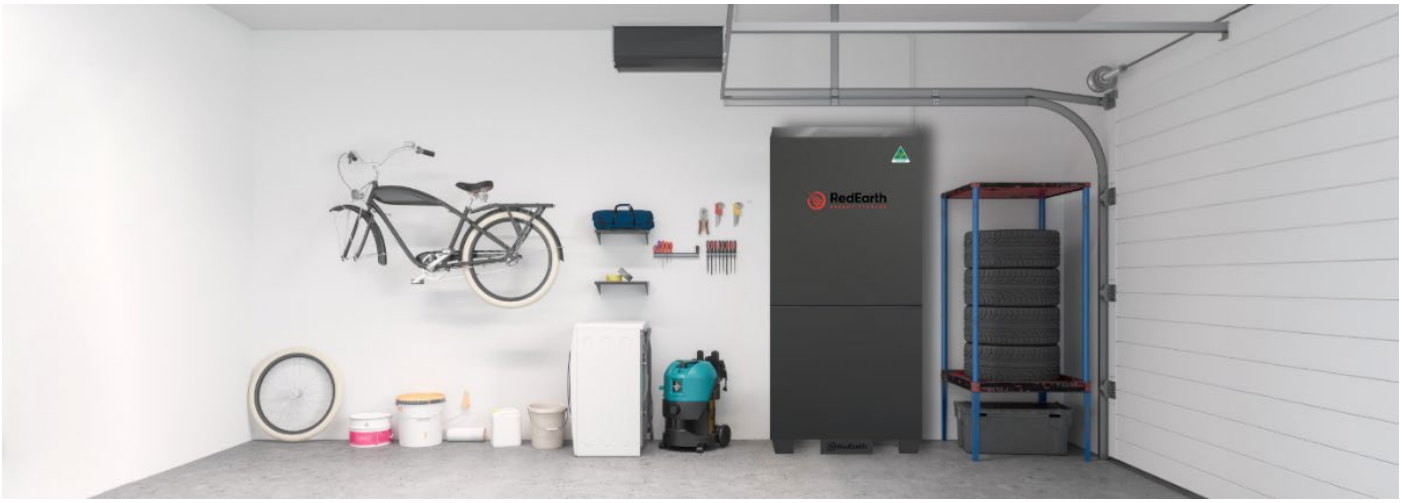
Up to 30 kW of panels can be connected to the 15 kW 3-phase Gecko and 20 kW of panels to the 10 kW 1-phase Gecko. This is usually enough to meet the needs of a typical home as well as charge an electric vehicle, using only electricity generated at home. The Gecko system can easily be retrofitted to an existing PV solar system that may already be installed at the home.

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

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

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

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



RedEarth's Private Power Plant (PPP)

RedEarth offers its propriety Private Power Plant (PPP) to generate more value for Gecko system owners than is available from other battery systems.

With a Gecko installed, they not only gain access to a continuous source of renewable energy; by harnessing the untapped potential of their rooftop, they can generate more solar energy than needed to power their residence or business. The result? Their property can become their very own energy trader, creating an additional value stream by feeding surplus energy back into the grid or sharing it with family. This not only offsets energy costs but could even turn a profit.

Included PPP modules currently available are:

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

Gecko system owners can join RedEarth's Smart Energy Trading program, which uses our proprietary trading algorithms to maximise their returns. Customers can register directly through the RedEarth app—the same platform they already use to monitor their Gecko.

Smart Energy Trading requires a suitably sized Gecko system and a wholesale energy retailer. Our support team can confirm whether the system meets the requirements.

Smart Energy Trading PPP modules currently available include:

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

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

Gecko system description

Opening the Gecko

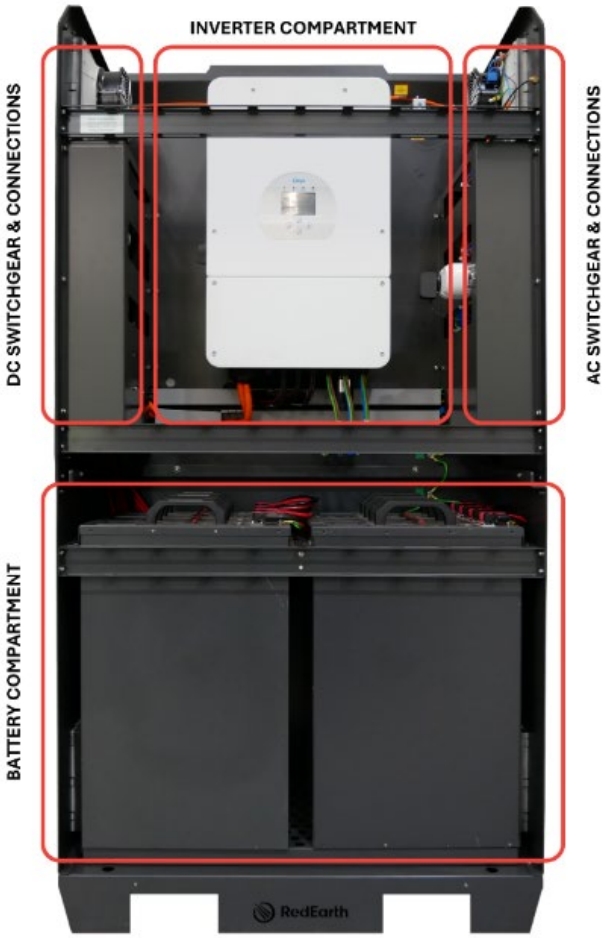
RedEarth's Gecko battery system can be accessed by removing the upper (inverter compartment) and lower (battery compartment) lids.

To remove the upper compartment lid, remove the six M6 screws, lift and pull the cover away from the unit and place in a safe location.

After the upper compartment lid is removed, access to the battery compartment, when required for installation or maintenance, by removing the six M6 screws on the lower lid.

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

Inside layout



The Gecko is divided into four main areas. The lower section is the battery compartment, while the inverter compartmennt is the top middle section. On the right side are the AC electrical components and cable connection points. On this side is also the communication device. Lastly on the left side are the DC electrical components and cable connection points for installation.

Prior to leaving the factory the system is tested. It leaves the factory with the inverter cabling fully connected and ready-to-run. The batteries are removed for transportation.

Battery compartment

Up to eight RedEarth Troppo ULTRA 5.6 kWh Lithium batteries can be installed in the Gecko.
All eight sets of battery cables are pre-wired into the system. This makes it very easy to add additional batteries in the future.

Note: The batteries are shipped in separate boxes and installed during installation.

Inverter compartment

Here you will find the Deye Inverter (5 kW or 10 kW for 1-phase and 12 kW or 15 kW for 3-phase). All the internal connections from the inverter to the AC and DC switchgear is completed in the factory. Also, 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 connections (AC and DC)

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

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

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

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

Note: The switchgear and connection point locations for both 1-phase and 3-phase systems are similar.

The photos show a 3-phase system.

AC SWITCHGEAR AND CONNECTION POINT LOCATIONS

DC SWITCHGEAR AND CONNECTION POINT LOCATIONS

Parts kit and documentation

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

Documentation

- Gecko installation manual (this document)
- Gecko user guide
- Gecko customer handover checklist
- Gecko identification sheet (serial #s etc.)
- SDS Troppo ULTRA Battery (Safety Data Sheet).
  Note: This SDS must be left with the Main SwitchBoard for the fire brigade.
- Deye inverter user manual
- Eastron feed-in meter manual
- Warranty terms

Parts kit

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

Overview of installation tasks

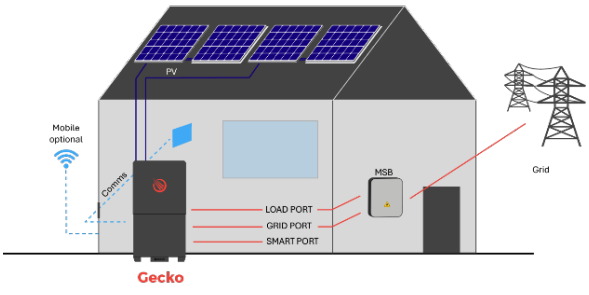
Preparing for an installation

- Decide on the location of the Gecko, using the information in Step 1. Positioning and mounting.
- Depending on the site and installation, decide on the length and size of the cables to run.
    - The cables for connecting the MSB to the Grid, SMART and Load ports must be sized to support the installation of the 5 kW, 10 kW, 12 kW or 15 kW inverter according to AS/NZS 3008.1.1:2017.
    - 40 A or 50 A MCBs are installed in the Gecko, depending on the kW rating of the inverter.
- If a generator is part of the installation, ensure it is a **G3 rated generator** (find more information at https://redearth.energy/support/)
- Plan the PV solar installation.
    - PV modules must have an IEC61730 Class A rating.
    - PV racking and solar panels should be designed and installed in accordance with AS/NZS 5033 and the latest CEC Installation guidelines.
    - In selecting PV panels and the wiring method, ensure Open Circuit Voltage (V_{OC}) and Short Circuit Current (I_{SC}) ratings are not exceeded.
    - Ensure that the array is within the inverter specification and that the polarity of the array is correct.
    - It is important to connect PV strings of equal length and orientation when 2 strings are going into one MPPT.
- When you know the installation date, book the time with RedEarth so that they are sure to be available to help you and to confirm that the system and the remote monitoring is properly setup.

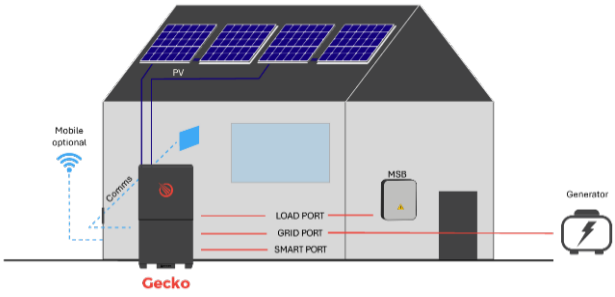
Electrical connections

The Gecko can be installed as an on-grid or an off-grid installation. Both installations follow the same process. In an off-grid installation there is no grid connection, but it will usually include a backup generator.

On-grid example



Off-grid example



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

- **Batteries:** The Gecko is pre-wired for up to eight Troppo ULTRA batteries. Each Troppo ULTRA battery has a nominal capacity of 5.6 kWh. The batteries need to be installed and plugged in.
- **Grid:** AC cables run from the MSB (Main Switch Board) directly to the grid terminals inside the Gecko system. Ensure to observe the correct phase rotation in 3-phase system.

- **Load:** AC cables from the MSB connect directly to the Load terminals inside the Gecko system.
  The Gecko system can be used as a full home backup system. However, if the loads in a particular house are greater than the capacity of the Gecko system, it can be set up as partial backup load.

  For partial back-up systems:

  - The loads inside the MSB need to be split.
  - Ensure that the backup circuits do not overload the Gecko system.
  - It is recommended to exclude less critical loads from the backup circuit such as pool pumps or under floor heating.
  - Too many loads on the backup circuit can drain the battery quickly during an outage. You can consider using the Gecko's multi-purpose SMART Port to switch off less critical loads at a preset battery state of charge (SOC).
  - A feed-in meter/CT will need to be installed.

- **Optional - SMART Port connection:** The Gecko system has a third AC connection option, the SMART Port, that can perform different functions depending on how it is configured.

  - Generator: This mode will automatically call the generator when the SOC (battery state of charge) reaches a lower SOC and will stop the generator when the SOC reaches the higher SOC. If you require assistance adjusting these two set points, contact RedEarth tech support.
    The Gecko includes a 2-wire generator auto-start feature.
    By Default, the SMART port is configured to operate a Backup Generator. Please notify RedEarth at the time of sale, or installation if you wish to adjust this.
  - SMART load: If connecting a smart load, run your designated smart circuit into the terminal labelled SMART Port. This load will run when the batteries are above a programmed SOC, and power down when the batteries fall below this SOC. For example, an air-conditioner could be powered via this SMART Port so that in a power outage it will continue running until the battery reaches a pre-programmed SOC.
    The SMART port can also be configured to always provide power to this circuit when the grid is connected, independent of the battery SOC.
  - AC coupled solar: An AC coupled solar inverter, or micro-inverter can be connected into the terminal labelled SMART Port. This creates the opportunity to redirect the output of an existing PV system to this port, so that it can be controlled by the Gecko system.
    It is important that the shutoff frequencies are set appropriately so that the Gecko system can correctly manage this extra AC-coupled PV system (consult RedEarth tech support).
    It is also essential that the AC coupled PV does not exceed a 1:1 relationship to the Gecko inverter size (5 kW or 10 kW for 1-phase and 12 kW or 15 kW for 3-phase).

- **Main Switch Board wiring**

  - Main Switch Breakers. The MSB will require two breakers to be installed to allow the Gecko system to be isolated, for example to work on the RedEarth system.
  - Feed-in meter with CT or CT-only (both supplied) Required only for on-grid systems that are installed as a partial home backup. The meter is installed in the MSB and connected to the Gecko system via a Cat5/6 cable or similar (not supplied). CT-only can be used for distances < 10 m and connects directly into the inverter.
    Ensure correct installation as the measurements of the CT and meter affect the operation of the Gecko.
    - Check that the correct CT is used for the application – don't connect the CT-only to the feed-in meter.
    - Make sure the wires are connected the right way around.
    - Verify the CT is connected the right way around. The direction of current flow, indicated with the arrow on the CT, must point towards Gecko.
    - Ensure the CT is installed in the correct location. There should be no load between the CT and billing meter.

Note: *The Gecko is not designed to act as the customers MSB. 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.*

- **Solar:**

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

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

Additional tasks

- **Adjusting the settings of the Gecko inverter** for the customer's specific requirements. (e.g. adjust the level of grid-feed allowed by the utility or modifying the SMART Port function). Use the inverter touch screen to update these settings.
- **Remote monitoring:** For continuous monitoring, the Gecko needs a reliable internet connection. This applies to both on-grid and off-grid Installations. This can either be via mobile (4G) or connecting to the home internet. The best solution depends on the location. Generally, the home internet provides a more reliable solution. RedEarth recommends connecting to the home internet during installation either by wiring the Gecko to LAN or accessing the home WiFi.
  However, if only mobile is possible, check the reception on location. If reception is poor, try replacing the pencil style 4G antenna with the extension 4G antenna. An optional cell phone booster can further improve signal strength and increase reliability.
  The Gecko battery system comes with an automatically three-months free remote monitoring via mobile internet. After this initial period, there is a charge to continue remote monitoring via mobile internet.
  Note: When any issues with the system arise, it's invaluable to have a continuous monitoring history for troubleshooting. It's important to owner regularly checks the internet connection by accessing the RedEarth app.
- **Handover to the customer:** This includes demonstrating what circuits are backed up during an electricity outage, how the backup generator works (if one is installed) and confirming that the batteries are charging and discharging as required.

Installation

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

Eight steps to complete your Gecko installation:

Step 1. Positioning and mounting – the Gecko in its final location

Step 2. Battery installation

Step 3. Electrical connections – at the RedEarth system and the MSB (main switchboard)

Step 4. Solar connection

Step 5. Turn on / shutdown procedure

Step 6. Inverter setup

Step 7. Testing and commissioning

Step 8. Remote monitoring activation

Step 1. Positioning and mounting

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

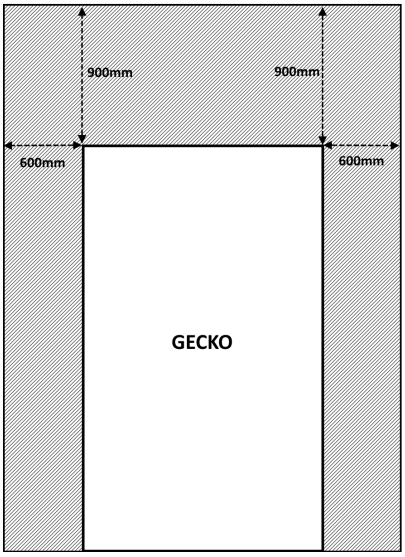
WARNING: Personal injury

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

Gecko size and weight

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

Positioning information



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

Cooling airflow

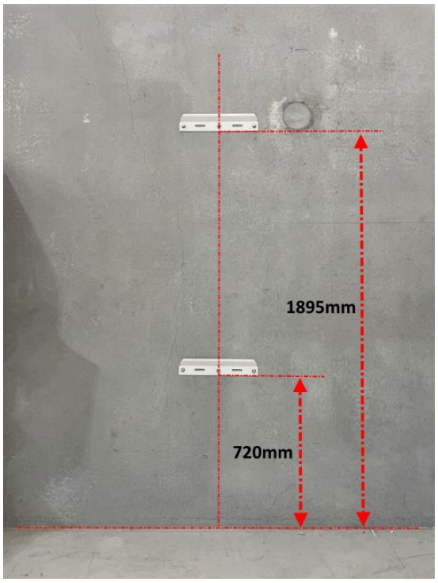
Cooling airflow passes up through intake filters in the base and lower sides of the Gecko system and then out through extraction fans/filters at the top sides of the unit. The fans are controlled by an adjustable temperature switch, set to 25^{0}C in the factory.
The filters need regular maintenance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

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

Installation and mounting order

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

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



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 levelling shims to ensure an even gap is maintained to the wall behind. When the wall and concrete slab are not perpendicular (90°) to each other, shims on the front or rear feet of the Gecko ensure an even wall gap.
4. Once in position, use the holes in the feet to mark the location for the supplied Dynabolts on the concrete slab.
5. Remove the battery compartment and install the Dynabolts.
6. Re-install the battery compartment, ensuring the wall mount is correctly inserted, and has maintained an even gap to the wall behind (using shims if required). Secure the battery compartment to the concrete slab using installed Dynabolts.

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 Gecko and the wall behind, cannot enter via the mounting slot. For any possible future warranty issues, RedEarth advice to take a clear photo of this completed.
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 Gecko inverter compartment while being lifted into place.
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 seated on top of the battery compartment. There are inspection holes in the top mount hook to ensure the wall mount is completely engaged within the mounting hook.

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

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

10. Use the supplied 4 x M8 screws and washers, to securely mount inverter compartment to the battery compartment.

Once the above steps are complete the Gecko is ready to install the batteries and to be wired to the MSB and PV.

Before any electrical connections are made:

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

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

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

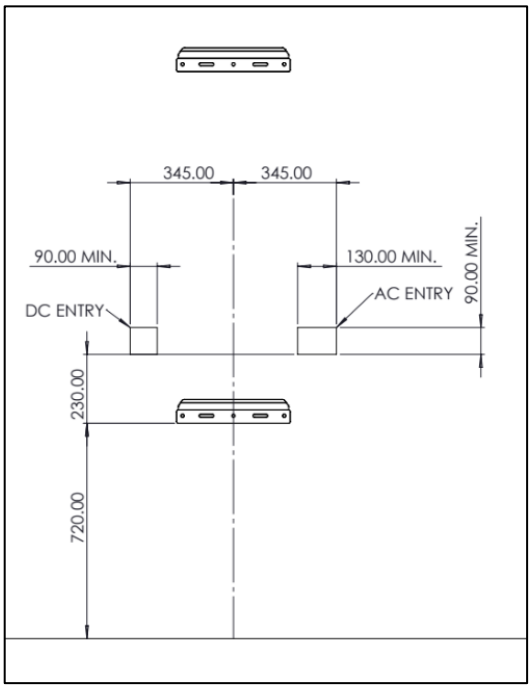
Gecko's communications device, the RUT, is also located on the right-hand side of the unit. Below the AC escutcheon panel is the comms access panel. It can be accessed by removing the 2 x screws.

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

Rear/hidden cable entry access template

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

The below template shows the location of the rear access gland holes with respect to the lower wall mount.
Note: please confirm with the actual product, as earlier enclosures have a slightly different pattern.



Step 2. Battery installation

Troppo ULTRA with BMS

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

Battery connection

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

2. **Physical installation**
   - Take the batteries out of the transport boxes and place them next to the Gecko system.
   - Push button on the top of each battery to turn on the BMS displays of all batteries. Confirm that they are all at a similar voltage (within 0.5 V from each other). **Note:** all batteries will show Troppo-1 on the display. When the communication cables are wired, they will be allocated their battery number.
   - On the battery compartment remove the lower lid (6 x M6 screws) and the support rail (4 x M6 nuts and 2 x M6).
   - Install the Troppo ULTRA batteries evenly left to right. Start by loading the Master battery (number 1 in the picture), in the left, most rear position.
     Install the other batteries following the physical installation order **1 to 8** to ensure even loading of the Gecko.

Physical installation order

Master 1	2
3	4
5	6
7	8

   - Reinstall the battery support rail. Secure the batteries to the side and centre rails, using the M6 screws provided in the parts kit. (min. 2 per battery).

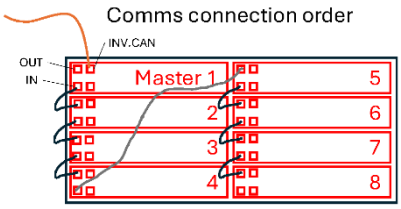
3. **Earth connections**
   - Daisy-chain the battery earth link cables on both battery banks using the provided bolds and star washers
   - Connect the batteries in the most rear position (numbered **1 and 2**) to the battery compartment earth stud.
   - Connect the battery compartment earth stud to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

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

5. Communication connections

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

- Connect the pre-wired BMS Comms cable from the inverter into the INV CAN port in the Master battery (Master 1 in the picture).



Connect the supplied BMS ethernet cables as per the picture of the Comms connection order of an eight (8) batteries installation.

Starting from the **IN** port of Master battery **1** into the **OUT** port of battery **2**. The OUT port of Master Battery 1 stays empty.
Continue connecting the **IN** port of battery **2** to the **OUT** port of battery **3** and so on to the **OUT** port of Battery **8**.
The IN port of battery **8** stays empty.

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

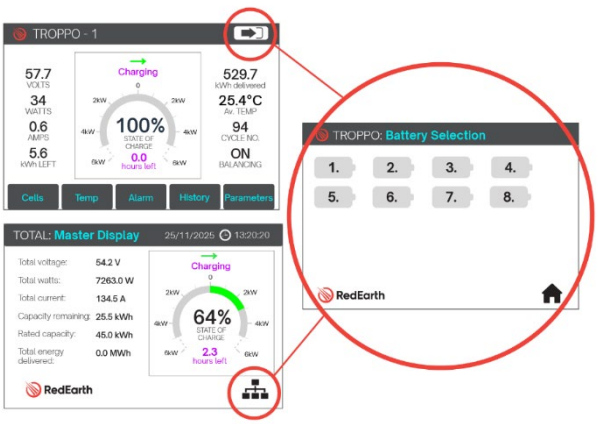
The batteries will be allocated their battery number e.g. the display of battery 2 will show Troppo-2 (touch the display to wake if needed). This can take up to 5 minutes.

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

This is a completely wired battery pack.

6. Turning the batteries on

- Turn the OVER CURRENT PROTECTION breakers on top of each battery **ON**.
  You will notice the voltage levels equalise as the batteries balance with each other.
- From the master battery display navigate to the Troppo: Battery Selection screen.
  There are two options to do this:
  1 From the *Troppo-1* screen, click on the arrow in the right top corner.
  2 From the *Total: Master Display* screen, click on the network icon on the bottom right.



- Ensure the Master battery **1** 'sees' all the Slave batteries, as per *TROPPO: Battery Selection* screen (see image).

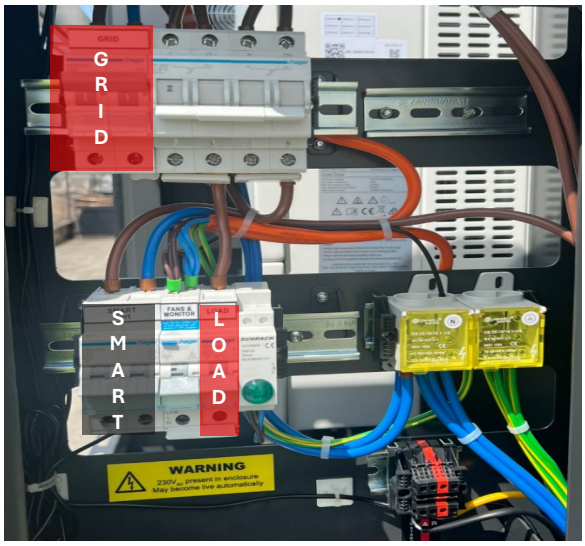
If the Master battery cannot see all the Slave batteries, or if the batteries are not numbered 1,2,3,....up to 8, check the BMS ethernet cables are securely connected to the right port and in the correct order.

Step 3. Electrical connections

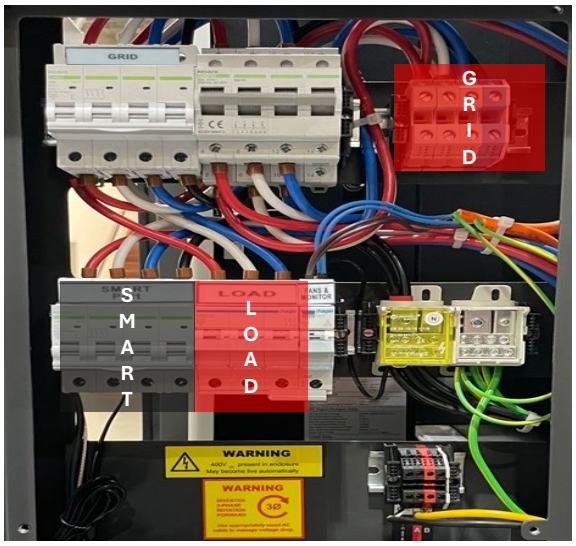
3.1 Grid, Load and Smart port connection

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

1-phase AC

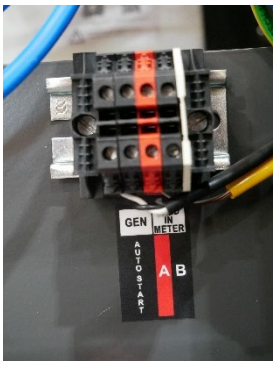


3-phase AC



Grid port:

- **On-grid installation:** wire the Grid connection from MSB into screw terminals (3 phase) or breaker (1 phase).
- **Off-grid installation**: Connect the generator to the Grid port.
  If the generator is 2-wire auto-start capable, connect the generator with two wires to the terminals inside the RedEarth system. These are located on the bottom right side of the AC DIN rail.
  This will automatically start the generator when the batteries are depleted.
  If the generator is not compatible with 2-wire auto-start it must be manually started and stopped when the batteries are depleted.
  Note: any connected generator must be 3G rated.



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

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

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

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

3.2 Main switch board wiring

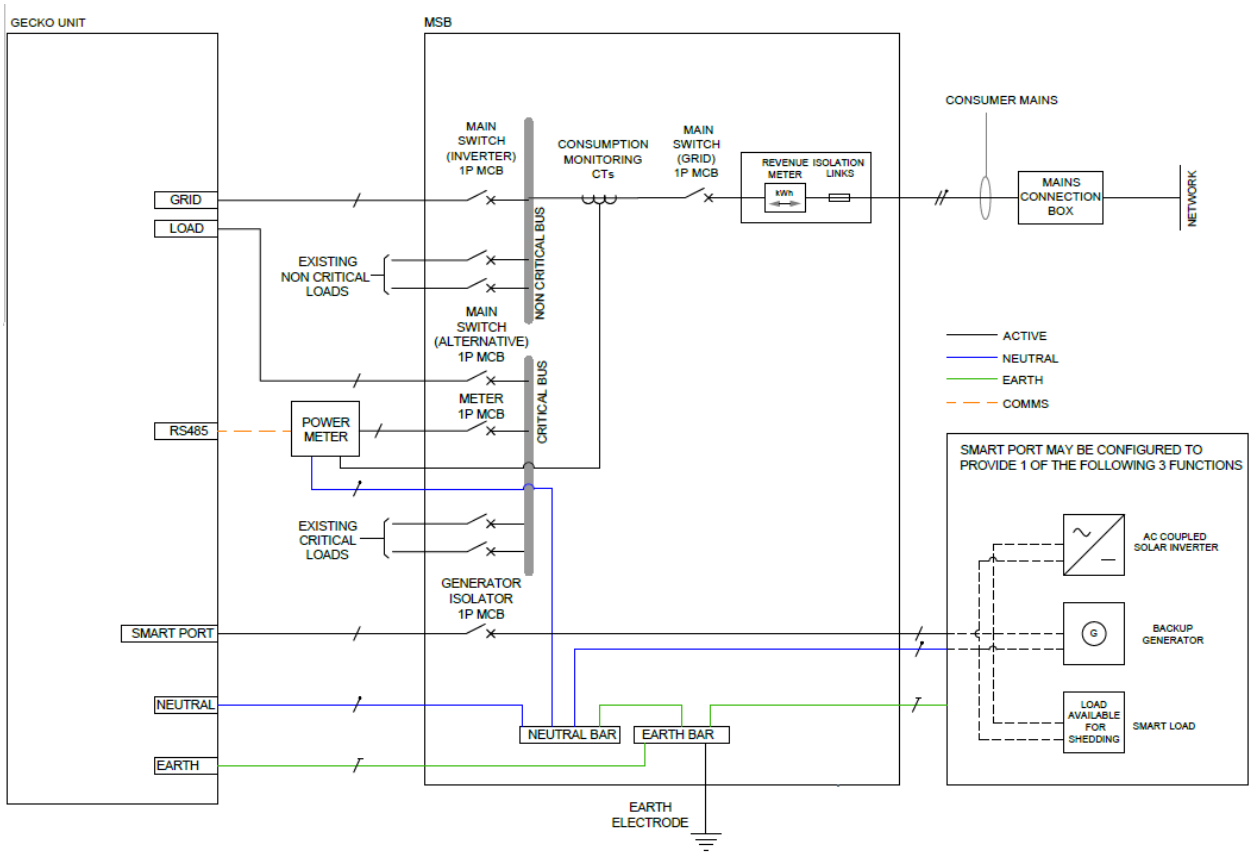
The Gecko system must be hardwired to a main switchboard which contains a MEN link, and an earth stake.

The correct wiring of the main switch board (MSB) depends on the type of installation. Refer to the section related to the current installation:

- On-grid installation, partial home backup
- On-grid installation, full home backup
- Off-grid installation

On- grid installation, partial home backup

During a blackout the backup loads connected to the Load terminal of the Gecko system will keep functioning. The non-backup loads will turn off until grid power is restored. Typically, non-backup loads are loads like pool heating or electric floor heating.
If too many loads are backed up the battery could run flat quite quickly, or the backup circuit could become overloaded and turn off temporarily.

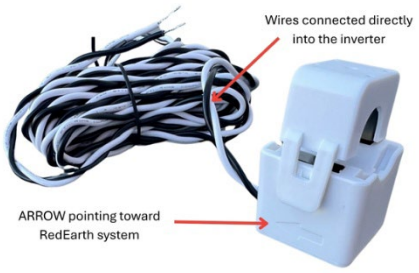


Four tasks must be completed in the MSB for an on-grid installation with partial backup load:

1. Install the supplied Main Switches (Inverter and Alternative) breakers to isolate the RedEarth system if work is being done on the system.
   The 1-phase systems are supplied with two 1-pole MCBs, the 3 phase systems with two 3-pole MCBs.
2. Separate the circuits in the main switchboard into backup loads and non-backup loads and install appropriate MCB breakers.

3. Install a CT meter. There are two options for this:
   First option:

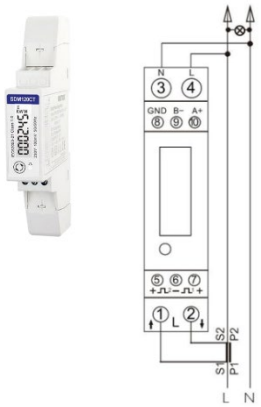
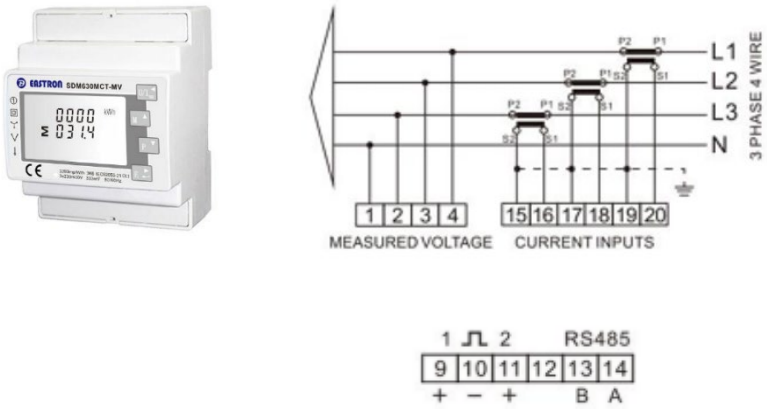
   - Install the Deye CTs.
     The CTs need to be connected at the incoming grid connection, as far upstream as possible, but before the Main Switch (Grid) . Ensure the arrow points away from the grid towards the RedEarth system. The wiring on the CT meter can be extended to a maximum of 10 meter using best practice methods to ensure accurate readings.



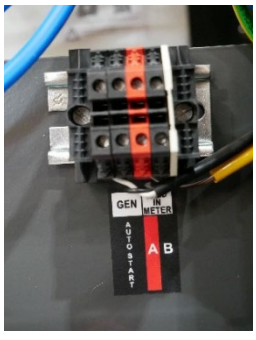
   - Connect the CTs directly to the Deye inverter.
   - Check the readings using a clamp meter. If incorrect, check the arrow is pointing in the right direction.

   Second option:

   - Install the supplied Eastron feed-in meter in combination with the Eastron CTs (one CT for 1-phase, 3 CTs for 3-phase).
   - The CTs need to be connected at the incoming grid connection, as far upstream as possible, but before the Main Switch (Grid). Ensure the arrow points away from the grid towards the RedEarth system.
     The meter wiring is shown below. Further information can be found in the manual for the feed-in meter that is included in the parts kit.

1-phase meter wring	3 phase meter wiring
	

   - Install an appropriate MCB breaker.
   - Connect the feed-in meter back to the RedEarth system.
     The communication cable is not provided. It can be made using 2 wires of a CAT5 or CAT6 cable. Connect one strand to A and the second to B on the Eastron meter. See the images for corresponding terminals.
     Inside the Gecko, the cable connects to the terminals A and B labelled 'feed in meter', located on the end of the AC DIN rail. Strip the end of the strands and connect them to the correct terminals.



   - Adjust the inverter settings as required. See Inverter setup.

Note: *Ensure to use the correct CT for the chosen option, otherwise the readings will be incorrect.*

4. When the SMART port is used, install a Generator Isolator MCB.
   For options on usage of the SMART port connection, see the section Preparing for an installation.

On-grid installation, full home backup

For a full home backup, the system needs to be sized appropriately to cover the maximum load demand. The inverter uses its internal CT to control the grid exports and there is no need to install an external CT and feed-in meter.
Only one step is required.

1. Install the supplied Main Switches (Inverter and Alternative) breakers to isolate the RedEarth system if work is being done in the MSB. At all other times these breakers remain on.
   The 1-phase systems are supplied with two 1-pole MCBs, the 3 phase systems with two 3-pole MCBs.

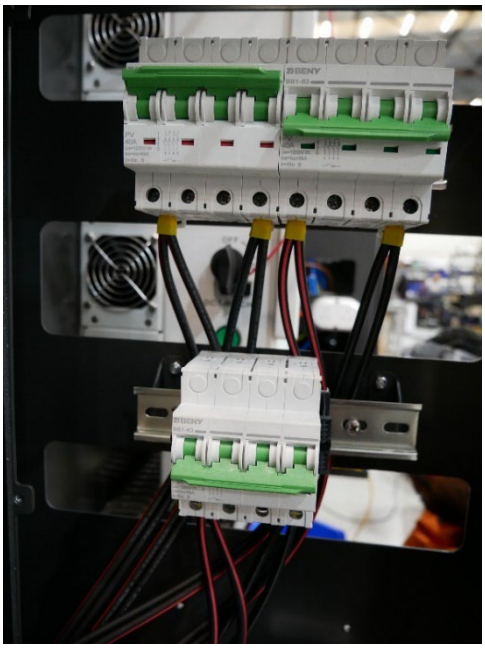
Off-grid installation

In an off-grid installation only one step is required to connect to the MSB.

1. Install the supplied Main Switches (Inverter and Alternative) breakers to isolate the RedEarth system if work is being done in the MSB. At all other times these breakers remain on.
   The 1-phase systems are supplied with two 1-pole MCBs, the 3 phase systems with two 3-pole MCBs.

Step 4. Solar connection

A Gecko system has two (or three for the 10 kW version) Maximum Power Point Trackers (MPPTs).



PV isolators
The PV DC isolators are located on the left side of the unit. The PV isolation is provided in the Gecko via built-in MCBs. The number of MCBs depends on the size of the Gecko system:

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

Note: It is important to connect PV strings of equal length and orientation when 2 strings are going into one MPPT.

As an example, the image shows the 10 kW 1-phase system.

Connect the solar arrays

- Open the left side access door and remove the escutcheon panel (6 x M5 screw). This will provide direct access to all the DC isolators for PV connections.
- Run the pairs of unterminated PV cables into the 25 mm holes on the DC side or rear of the Gecko. The glands provided in the parts kit are designed to seal around 25 mm flexible conduit.
- Check for correct polarity and V_{OC}, then terminate the cables into the appropriate MCB (follow the labelling).
- Ensure that the PV isolator built into the inverter is in the ON position. It is located on the left side of the inverter below the ON/OFF button, as shown here.

- *PV modules must have an IEC61730 Class A rating*
- *Ensure that the array is within the inverter specification and that the polarity of the array is correct*
- *PV array must be floating (must not be grounded)*
- *Earth connection must be made to the same switchboard as the power cables*
- ***Earth Fault Alarm:***
  This system complies to IEC 62109-2 clause 13.9 for earth fault monitoring.
  The Earth fault alarm is built into the system. If an earth fault is detected, then a loud audible alarm will sound.

Step 5. Turn on / shutdown procedure

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

- ❑ Check the PV solar cables have the correct polarity and are correctly connected to the breakers provided, particularly any parallel strings going into the same MPPT.
- ❑ Check Grid, Load and SMART port cables are securely connected.
- ❑ Check the system is correctly earthed.
- ❑ Check a MEN link is in place in the main switchboard.
- ❑ Check proper weatherproof seals are installed on all cable entry glands.
- ❑ Check the battery terminal connections on the BATTERY SYSTEM D.C. ISOLATOR MCCB are tight. (they might have come loose during transportation)
- ❑ Check the Wi-Fi and 4G antennas have been installed using the SMA adapters on the top right side of the unit. (antennas are supplied in the parts kit)

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

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

Switch ON all Over-current protection breakers on top of each Troppo ULTRA battery

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

Open the door at the left-hand side off the unit.

Switch on the **Battery System D.C. Isolator**.
Note: ON is red

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

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

Ensure the switch on the left side of the Inverter is ON.

Switch ON all **SOLAR D.C. ISOLATORS**. It depends on the system how many Isolators there are.

① **Switch ON all AC breakers**

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

Switch on Grid, Load and SMART ports.

Wait for the system to start up

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

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

① **Switch OFF all AC circuit breakers**

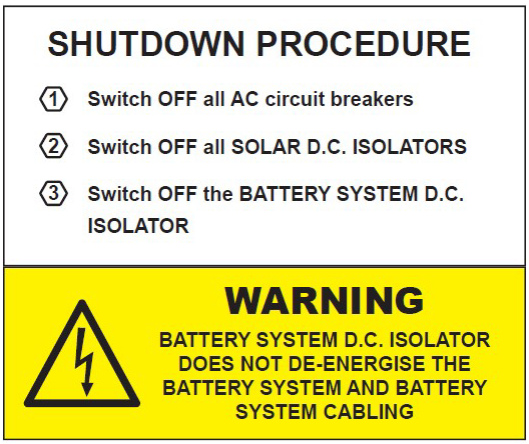
It is not necessary to turn off the inverter via the push button on the left side of the inverter (with the blue light).

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

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

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

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



Step 6. Remote monitoring activation

For continuous monitoring, the Gecko needs a reliable internet connection. When any issues with the system arise, it's invaluable to have a continuous monitoring history for troubleshooting. It's important that the owner regularly checks the internet connection by accessing the RedEarth app. This applies to both on-grid and off-grid installations.

The internet connection can be either via mobile internet or connecting to the home internet. The best solution depends on the location of the RedEarth system.

Generally, the home internet provides the most reliable solution. RedEarth recommends connecting to the home internet during installation if possible.

Antennas

Two pencil style antennas are supplied in the parts kit, one for mobile (4G) and one for Wi-Fi and are labelled accordingly. Screw in the antennas into the SMA adapters on the top right side of the unit.

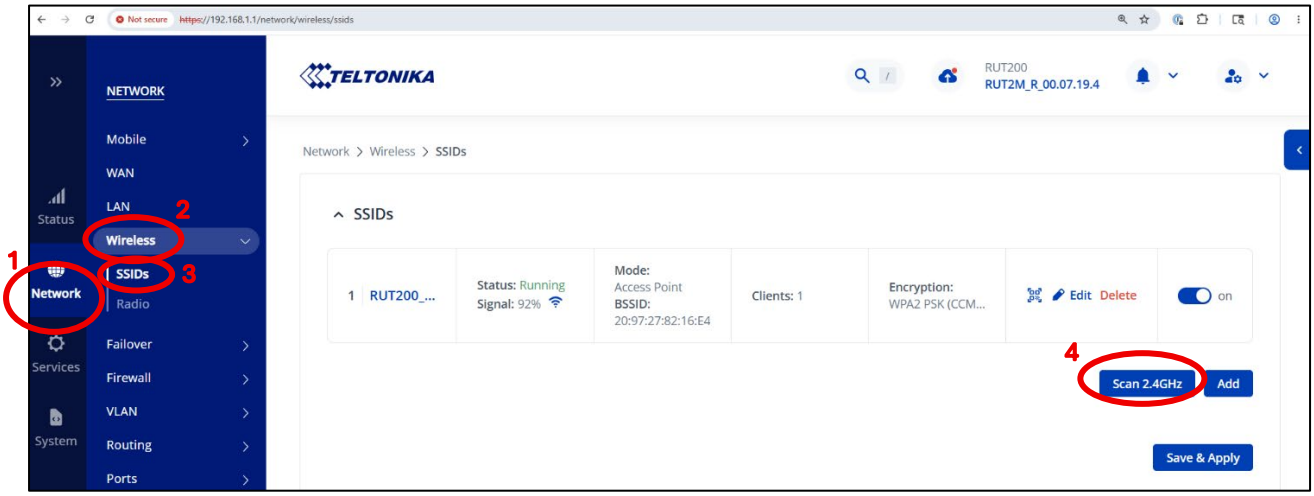
The antennas have opposite gender SMA connectors so that they cannot be incorrectly installed into the wrong adapter.

Connect to the home internet

There are two options to connect to the home internet:

1. Wiring the Gecko to LAN. This is the easiest option.
   - Use the gland labelled Internet
   - Feed your ethernet cable through
   - Plug it into the WAN port on the RUT device (this is the bottom ethernet port on the left side of the RUT). To create space to plug it in, you can unclip the RUT from the rail.

2. Access the home internet via Wi-Fi.
   - Ensure you are close to the RedEarth system to have a good connection
   - Connect your laptop to the RedEarth internet: network **RUT200_XXXX**, password **RedEarth07**
   - Open an internet browser and enter 192.168.1.1 in the address bar
   - In the Teltonika page that opens, login using Username: **admin**, Password **RedEarth07!**
     Note: the admin password has an exclamation mark as the last character
   - Navigate to **Network > Wireless > SSIDs** – as shown in picture 1, 2, 3
   - Select Scan2.4 GHz - as shown in picture 4 and click **Save and Apply**



   - Find the home network, click **Join network**
   - In **WPA passphrase** enter the password of the home network and click **Submit**

Connect to mobile internet

If it's not possible to connect to the home internet, the mobile option can be used. This requires positioning the Gecko in a good 4G reception area.
If installing in a closed area like a shed, remember to check the signal with the shed doors closed as this will affect the strength of the signal.

If the signal is weak or inconsistent, try replacing the screw-in pencil style mobile antenna with the supplied extension antenna. This extension antenna can be placed in a location with a better 4G signal, such as a roof, or an open area without interference.

If reception at the location is poor, an optional cell phone booster can improve signal strength and increase reliability.

Note: The Gecko battery system comes with three-months free remote monitoring via mobile internet. After this initial period, there is a charge to continue remote monitoring via mobile internet.

Remote monitoring

The customer can scan the QR code on the outside of the Gecko system and register their system for warranty.

Once the customer completes registration by filling in their details, remote monitoring and control are available via RedEarth's app.

The installer can also scan the QR code and login with the installer credentials. Then link the plant to the installer account.

Step 7. Inverter setup

The Gecko has been commissioned and tested in RedEarth's factory to confirm correct operation of the system prior to shipment. However, parameter adjustments may be required to customise the unit for the site for example 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.

Power up the Gecko system

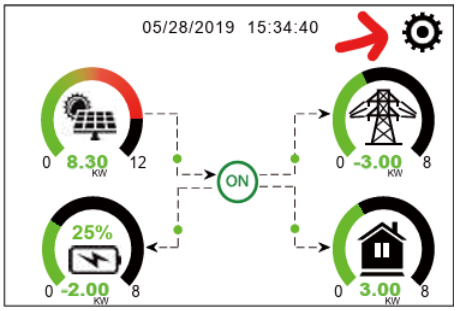
- Power up the Gecko following the Turn On/Shutdown procedure.
  Note: the inverter can take up to 5 minutes to fully start-up when the system is initially powered up. You may hear several relays clicking during start-up.

Confirm inverter settings and complete on-site parameter adjustments

NOTE: Changes to the Gecko settings must be done by a trained/qualified person. If in doubt, contact RedEarth Support.
Fault codes table. If any faults occur during the process, look up the code in the appendix and correct any faults.
Inverter manual: More detailed information can be found in the inverter manual that is included in the parts kit.

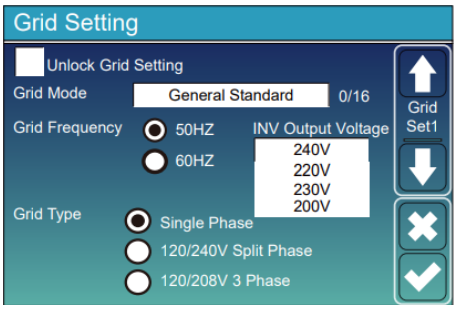
Access the Gecko inverter via the Inverter Screen using the installer login.

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



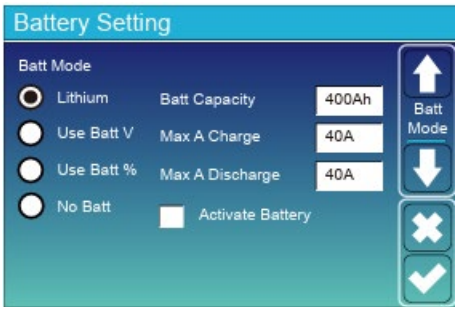
Grid Setting > GridSet1 - On-grid only

- Confirm the settings are suitable for the installation site.
  To change:
  - Select **Unlock Grid Settings**
  - Enter **Grid Mode** Australia A, B or C
    This will set the power quality response mode and grid protection settings to the default values for Australia region A, B, C respectively.



Battery Setting > BattMode

- Confirm **Lithium** is set as battery type.
- Confirm **Battery Capacity** equals the number of Troppo ULTRA batteries x 110 Ah.
- Confirm both **Max A Charge** and **Max A Discharge** are set matching the system according to the following table:



Batt	5 kW	10 kW	12 kW	15 kW
1	N/A	N/A	N/A	N/A
2	120	200	N/A	N/A
3	120	220	240	N/A
4	120	220	240	N/A
5	120	220	240	N/A
6	120	220	240	280
7	120	220	240	280
8	120	220	240	280

System Work Mode > WorkMode1

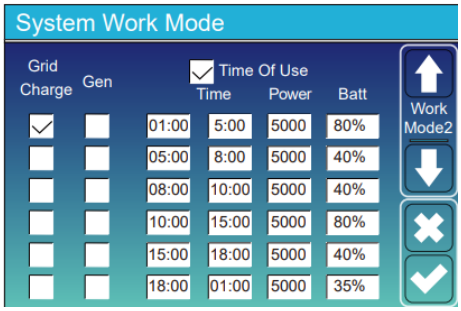
Confirm or set the following values:

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

System Work Mode > WorkMode2

Customise the settings as appropriate for the installation.
The default settings are:

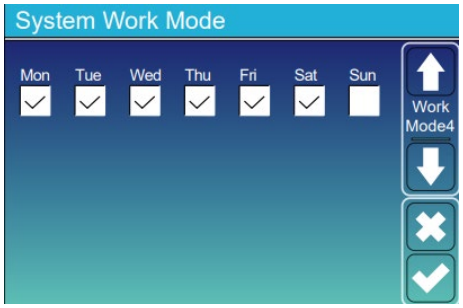
- **Time of Use** selected– this enables all other settings.
- **Grid Charge** selected – indicates to use the grid to charge the battery in this time period (select for all time periods).
- **Gen Charge** unselected– indicates the generator to charge the battery in this time period. Used for systems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



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

System Work Mode > WorkMode4

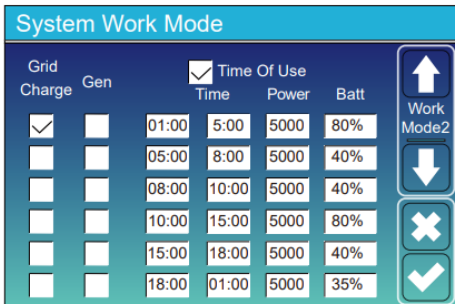
- Confirm **Time of Use** selected for all days. This indicates the days on which the settings are enabled.

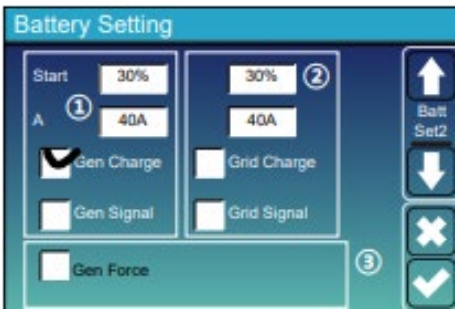


Adjusting Generator Charge Rate – Off-grid only

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

- Navigate to **System Work Mode > Work Mode2** and adjust **Power.** This will adjust how much the generator can be used to feed any loads if the battery is full.
- Navigate to **Battery Setting > Batt Set2**, select **Gen Charge** and adjust A to the Amps in which the generator will be allowed to charge the battery.
  Refer to the values set in **Battery Setting > BattMode** before

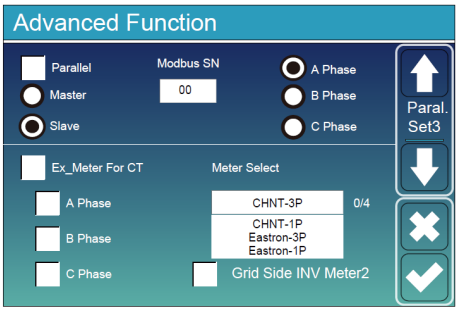




Meter setting - On-grid only

Adjust this setting when using the Eastron meter in a part backup installation

- Navigate to **Advanced Function > ParalSet3**
- Select **EX_Meter For CT**
- In **Meter Select,** choose the correct meter

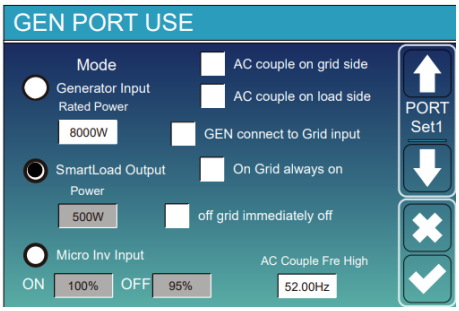


SMART port setup

The default SMART port setup is as a generator port. It can be reconfigured as either a smart load output port or as an AC-coupled solar energy input port.
1.Navigate to **System Setup > Gen Port Use**

Setting the SMART port to Smart load output

For example, used to connect a water heater.



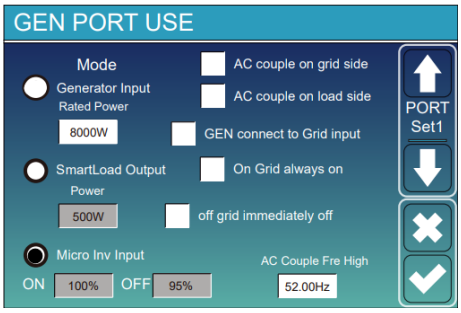
Select **SmartLoad Output**
Set the following parameters to tune the Smart load to the customers' requirements:

- **Power:** the PV power above which the Smart Load can turn on
- **On Grid always on:** Usually not selected. Select it only if the smart load must always operate when the grid is present.
- **off grid immediately off:** Select this is the Smart load must turn off when the grid is off
- **ON:** This is the Battery SOC at which the Smart load can switch on. Usually set near 100%
- **OFF:** This is the Battery SOC at which the Smart load can switch off. The ON value should always be larger than the OFF value.

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

Setting the smart port to AC-coupled solar input

To connect an extra or existing PV solar inverter.



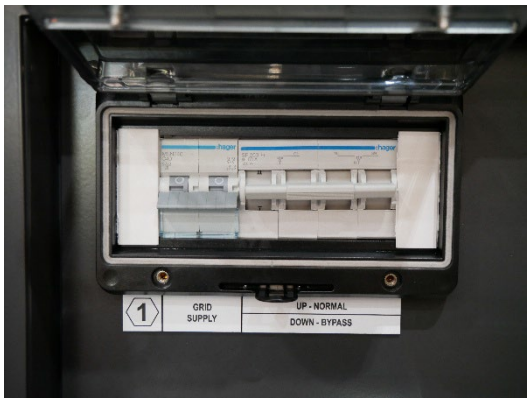
- Select **Micro Inv Input**
- Set the following parameters to tune the AC-coupled solar input port to the customer's requirements:
  - **ON:** The battery SOC at which the AC-coupled PV solar turns on.
  - **OFF:** The battery SOC at which the AC-coupled PV solar turns off.
  - **AC Couple Fre High:** select the value to the microinverter setting. With **Micro Inv input** selected, the microinverter output power decreases linearly as battery SOC approaches the set OFF value. When battery SOC equals the set OFF value, the system frequency becomes the set AC couple Fre high value, and the Microinverter stops working.

Step 8. Testing and commissioning

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

Normal operation

The Gecko will use solar, battery and grid depending on the situation.



- Ensure all the breakers and isolators are in the ON position.
- Ensure the Bypass switch is in the up – normal position.
- Confirm the Gecko is converting PV to charge the batteries and supplying the loads.

Bypass operation

The system will completely bypass the inverter and battery. The grid will provide power directly to the load.

- Ensure all breakers and isolators are turned OFF.
- Switch the Bypass switch into the Down – Bypass position.
- Confirm the load is powered and the Gecko is correctly bypassed.

Note: *The breakers in the MSB Main Switch (Inverter) and Main Switch (Alternative) must remain on during normal and bypass operation.*

Backup function

When there is a grid outage, the Gecko will take over the loads that are connected to the Load port of the Gecko. For a large RedEarth system this can be all the loads of the home. For a smaller system it will be only the backup loads for example the fridge and home Wi-Fi.

- For on-grid applications, turn off the main house breaker - Main Switch (Grid).
- Confirm the correct circuits are operating in Backup mode.

Fan control

The thermostat is located inside the unit. This automatically starts the fans once the temperature rises above the set-point. It is set to 25^0 C in the factory.
To test the fan operation

- Temporarily adjust the set-point by turning down the blue dial with a small screwdriver
- Confirm the fans start when the set-point is lowered just below the current ambient temperature.
- Return the setting to 25^0 Celsius after the test.

Monitoring

The availability of data from the system is important to get the most value from it. It is used to monitor and control the Gecko and it's also invaluable to have a continuous data history for troubleshooting when any issue arises.
To test the data connection

- Open the RedEarth app
  You can use the customer's RedEarth app which has been setup in Step 6, or the installer RedEarth app when the plant is linked to the installer account in Step 6.
- Confirm information is appearing in the app.

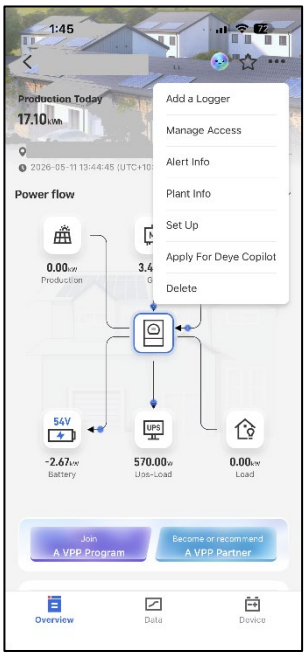
Generate the LFDI

To export energy back to the grid, the DNSP (Distribution Network Supply Authority) must be able to communicate with the inverter. For the inverter to receive the commands the protocol requires to generate an LFDI (Long Form Device Identifier). The installer sends this LFDI to the DNSP (out of band registration).

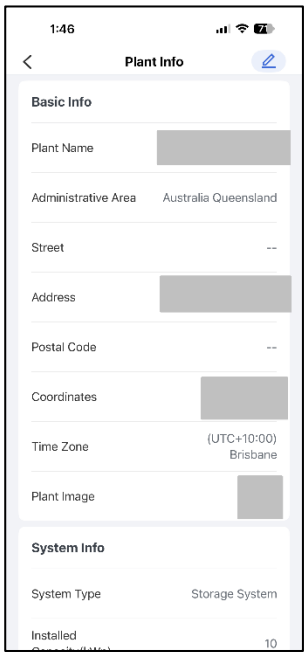
To generate the LFDI

1. Login to **Deye Cloud** with your business login
2. Click **more actions** (horizontal ellipsis (...)) and select **Plant info**
3. Click the **Edit** (blue pencil)
4. Click ***Utility Connection Registration >***
5. Select the relevant Utility Server, fill in the **Device SN** and **NMI** and submit

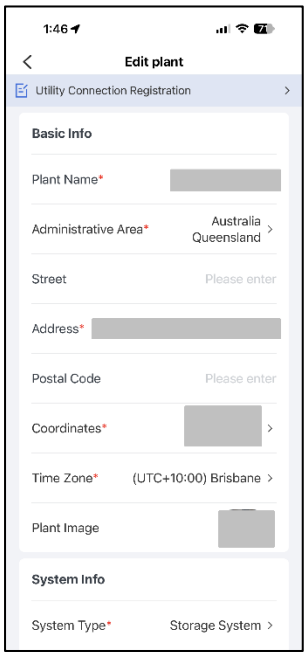
   Please take extreme care to do this accurately.
   If the numbers are incorrect, it will not work and it's a complicated and lengthy process to correct it.
6. It will now show the generated LFDI



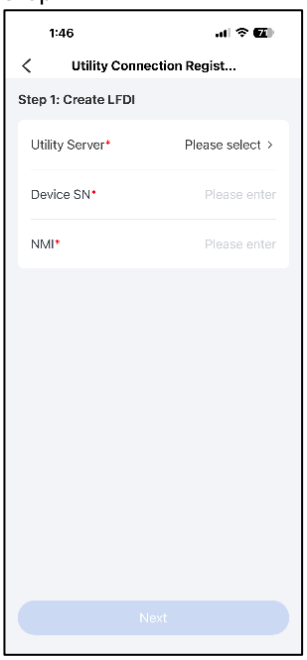
Step 2



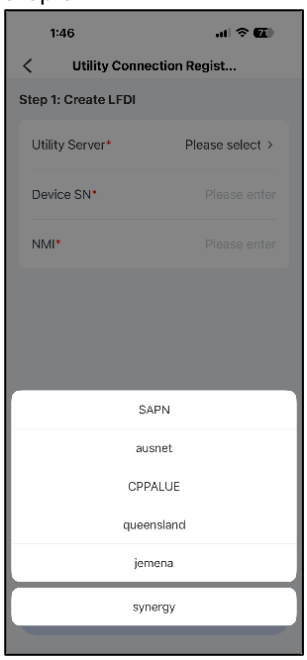
Step 3



Step 4



Step 5



Step 5

Additional options available for the Gecko

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

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

Support

Technical support – for the installer

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

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

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

Customer support - for the owner

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

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

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

Gecko Customer Handover Checklist

RedEarth ENERGY STORAGE

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

☐ **Provide the documentation that comes with the Gecko**

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

Installer's contact details:

☐ **Provide an overview of your Gecko installation**

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

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

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

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

☐ **Demonstrate operation including:**

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

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

☐ **Demonstrate the operation and effect of the bypass switch**

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

☐ **Show maintenance requirements**

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

☐ **Register your system with RedEarth**

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

☐ **Activate Monitoring using the RedEarth App**

Monitoring your system is done via the RedEarth app

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

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

Appendices

Appendix A - Technical specifications Gecko systems

	Single phase		Three phase	
Gecko Model	**Gecko 5 kW** 2GC1-DY5-XUL	**Gecko 10 kW** 2GC1-DY10-XUL	**Gecko 12 kW** 2GC3-DY12-XUL	**Gecko 15 kW** 2GC3-DY15-XUL *~ Coming soon*
Battery capacity (Troppo ULTRA 5.6 kWh)	2 to 8	2 to 8	3 to 8	3 to 8
Battery capacity (kWh nominal)	11.2 – 44.8 kWh	11.2 – 44.8 kWh	16.8 – 44.8 kWh	16.8 – 44.8 kWh
Inverter model	5K-SG04LP1-AU	10K-SG02LP1-AU	12K-SG04LP3-AU	*~Coming soon*
Battery data				
Battery type	Troppo ULTRA 5156 LFP self-managed lithium			
Battery capacity (nominal)	5.6 kWh per Troppo ULTRA battery			
Battery operating voltage range (V)	40 V - 57.6 V			
Maximum charging current (A)	120 A	220 A	240 A	280 A
Maximum discharging current (A)	120 A	220 A	240 A	280 A
PV string input data				
Maximum allowable PV (W)	10,000 W	20,000 W	24,000 W	30,000 W
Maximum usable PV (W)	7,500 W	15,000 W	18,000 W	24,000 W
Maximum PV input voltage (V)	500 V	500 V	600 V	600 V
MPPT range (V)	150 to 425 V	150 to 425 V	200 to 600 V	160 to 600 V
Start-up voltage (V)	125 V	125 V	160 V	160 V
PV input current (A)	13 A + 13 A	26 A + 26 A + 26 A	26 A + 13 A	36 A + 36 A
Maximum PV Isc (A)	19.5 A + 19.5 A	44 A + 44 A + 44 A	39 A + 19.5 A	54 A + 54 A
No. of MPPT trackers	2	3	2	2
No. of strings per MPPT tracker	1 + 1	2 + 2 + 2	2 + 1	2 + 2
AC output data				
Rated AC input/output active power (W)	5,000 W	9,999 W	12,000 W	15,000 W
Maximum. AC input/output apparent power (VA)	5,000 VA	9,999 VA	12,000 VA	15,000 VA
Peak power (off-grid)	2 times of rated power, 10 sec			
Rated AC input/output current (A)	21.7 A	43.5 A	17.4 A	21.8 A
Maximum AC input/output current (A)	21.7 A	43.5 A	17.4 A	21.8 A
Maximum continuous AC passthrough (A)	35 A	50 A	40 A	50 A
Generator Total Harmonic Distortion (THDi)	< 3% (of nominal power)			
Power factor	0.8 leading to 0.8 lagging			
Output frequency and voltage	50 Hz; 230 V / 400 V, 240 V / 415 V			

	Single phase		Three phase	
Gecko Model	**Gecko 5 kW** 2GC1-DY5-XUL	**Gecko 10 kW** 2GC1-DY10-XUL	**Gecko 12 kW** 2GC3-DY12-XUL	**Gecko 15 kW** 2GC3-DY15-XUL *~ Coming soon*
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 II			
Certifications and standards				
Grid regulation	AS/NZS 4777.2			
EMC / safety regulation	IEC/EN 61000-6-1/2/3/4, IEC/EN 62109-1, IEC/EN 62109-2			
General data				
Operating temperature range (°C)	-40~60°C, >45°C derating			
Cooling	Smart cooling with temperature-controlled fans			
Weight of Gecko system (excl. batteries) (kg)	100 kg	120 kg	125 kg	140 kg
Size of Gecko system (mm)	1060 W x 1950 H x 450 D			
Protection degree of Gecko system	IP43			
RedEarth Warranty	10 years (AU & NZ and South Pacific region)			
Electrical connections	Grid connection, Backup circuits connection, Smart Port connection (AC coupled inverter/smart load/generator), PV array			
Monitoring	Monitoring hardware included and activated via RedEarth's app (subject to network availability).			
Energy trading	On-grid only			
EV charging	Yes			

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

Appendix B – Gecko (Deye inverter) fault codes

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

F41	Parallel system stop	1. Check the hybrid inverter working status. If there's 1 pcs hybrid inverter is in OFF status, the other hybrid inverters may report F41 fault in parallel system. 2. If the fault still exists, please contact us for help.
F42	AC line low voltage	Grid voltage fault 1. Check the AC voltage is in the range of standard voltage in specification; 2. Check whether grid AC cables are firmly and correctly connected; 3. Seek help from us, if cannot go back to normal state.
F47	AC over frequency	Grid frequency out of range 1. Check the frequency is in the range of specification or not; 2. Check whether AC cables are firmly and correctly connected; 3. Seek help from us, if cannot go back to normal state.
F48	AC lower frequency	Grid frequency out of range 1. Check the frequency is in the range of specification or not; 2. Check whether AC cables are firmly and correctly connected; 3. Seek help from us, if can not go back to normal state.
F56	DC busbar voltage is too low	Battery voltage low 1. Check whether battery voltage is too low; 2. If the battery voltage is too low, using PV or grid to charge the battery; 3. Seek help from us, if can not go back to normal state.
F58	BMS communication fault	1. It tells the communication between hybrid inverter and battery BMS disconnected when"BMS_Err-Stop" is active; 2. If don't want to see this happen, you can disable "BMS_Err-Stop" item on the LCD; 3. If the fault still exists, please contact us for help.
F63	ARC fault	1. ARC fault detection is only for US market; 2. Check PV module cable connection and clear the fault; 3. Seek help from us, if cannot go back to normal state.
F64	Heat sink high temperature failure	Heat sink temperature is too high 1. Check whether the work environment temperature is too high; 2. Turn off the inverter for 10mins and restart; 3. Seek help from us, if cannot go back to normal state.

Power yourself.