

ANTIGRAVITY BATTERIES

DEEP CYCLE DC-100-V2

USER MANUAL



INTELLIGENT LITHIUM-ION DEEP-CYCLE BATTERY

100 Ah Lithium Iron Phosphate Battery (LiFePO4)

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IMPORTANT! READ MANUAL BEFORE FIRST USE



PRIOR TO USE, PLEASE READ AND UNDERSTAND ALL PRODUCT SAFETY INFORMATION AND THIS USER MANUAL.

Failure to follow these safety instructions may result in **ELECTRICAL SHOCK, EXPLOSION, or FIRE**, which may result in a **SERIOUS INJURY, DEATH, DAMAGE TO VEHICLE or PERSONAL PROPERTY**. DO NOT DISCARD THIS INFORMATION.

Introduction

THANK YOU

Thank you for purchasing the Antigravity DC-100-V2 Deep Cycle Battery. You have purchased one of the most advanced Batteries on the market. The DC-100-V2 offers a first of its kind Bluetooth Monitoring System allowing you to view the real-time battery status on your Phone, Tablet or Computer without having to physically be near the Battery. Additionally all the Antigravity Deep Cycle Batteries combine the very best UL Listed LiFePO4 Lithium cells along with an intelligent, extremely advanced Battery Management System (BMS) to ensure this battery will provide you with years of the safest operation, highest performance and satisfaction.

We want you to enjoy your investment in our Lithium-Ion Battery to its fullest potential, and get the longest life-cycle possible, so please take the time to read the entire Users Manual before installation to learn more about your Antigravity DC-100-V2 and how to best care for, maintain, and operate it in the safest manner possible.

For more information feel free to Contact us.

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Important Safety Warnings

1 DISCLAIMER

Antigravity Batteries, nor its manufacturers, nor partners, accepts no liability for any damage caused by:

- Force of nature including fire, typhoon, flood, earthquake, war, and terrorism.
- Intentional or accidental misuse, abuse, neglect or improper maintenance, and use under abnormal conditions.
- Improper installation, improper operation, and malfunction of peripheral devices.
- Contamination with hazardous substances, diseases, vermin or radiation.
- Alterations to the product in any manner without express written consent from the manufacturer.

2 GENERAL SAFETY INFORMATION / HANDLING WARNINGS

- Use Gloves, Goggles and proper protective gear when working with Batteries and Connections.
- Use only Insulated Tools when working with Batteries.
- Do not wear jewelry, or any metallic objects when working with Batteries.
- Do not touch any electrolyte, powder, or any other residue that has formed on Batteries.
- Do not connect or disconnect Terminals from the Battery without first disconnecting loads/devices.
- Do not place any tools on Batteries; short circuit can result.
- Keep Batteries out of reach of children.
- Do not dispose of any Battery as household waste. Use proper recycling channels in accordance with local, state, and federal regulations.
- Make sure any Charger, Charge Controllers and/or Devices are disconnected from Batteries before working with Batteries.
- Do not puncture, drop, crush, burn, penetrate, shake, or strike the Battery.
- Do not open, dismantle, or modify the Battery. Warranty will be voided immediately.
- Read complete manual and warranty before using the Battery.

Overview



GENERAL INFORMATION

The Antigravity DC-100-V2 with Bluetooth Monitoring is designed for use in Deep Cycle applications and as a direct replacement for Lead/Acid Deep Cycle Batteries. It is equipped with an advanced Battery Management System (BMS) that can manage and monitor the battery's performance during charge and discharge to ensure the safest operation and optimization for the longest life. It excels in Deep Cycle Applications such as uses in Recreation Vehicles (RVs), Utility Trucks, Emergency Vehicles, Boats, Golf Cars, Off-Grid Applications, Camping, Uninterruptible Power Supplies (UPS), Emergency Lighting, Alarm Systems, Smaller Photo-voltaic Energy Storage Systems (Solar), and many other uses where ultra lightweight, high amp-hour capacity and durability are required.



FEATURES

- **BLUETOOTH APP MONITORING:** The Antigravity DC-100-V2 is one of the first Deep Cycle Batteries to come with active ON-BOARD Bluetooth monitoring. Simply download the free App (Android or Apple) and be able to monitor your battery in real-time without having to access the battery. All important information is available right on you Phone, Tablet, or Computer if you are within 30ft (10M) of the battery.
- **ULTRASAFE, ADVANCED BATTERY MANAGEMENT SYSTEM:** The DC-100-V2 has the most advanced BMS available to provide battery protections and lithium cell balancing for the safest and longest lasting battery operation possible.
- **HIGHEST QUALITY COMPONENTS AND TECHNOLOGY:** Antigravity Batteries uses UL listed Cells, and an advanced Battery Management System.



THE BATTERY MANAGEMENT SYSTEM

The Antigravity Batteries DC-100-V2 is a state-of-the-art Lithium-Ion Replacement Battery for Lead/Acid. It has an extremely advanced Battery Management System (BMS) that prevents it from operating outside of certain parameters. This makes for an exceptionally safe battery operation while offering many performance benefits over the lead/acid battery it replaces. It has the following protections built in for safety and long life:

- **Over-Charge and Over-Discharge Protections:** If these conditions are detected the battery will disconnect, protecting itself from damage.
- **Over-Current and Short-Circuit Protections:** If Over-Current or Short-Circuit is detected the battery will disconnect, protecting the battery from a Thermal event.
- **Temperature Protections:** Within certain temperature ranges that are outside of safe charging parameters - if the temperature is too high or too low for safe operation - the Battery will not allow charging.
- **Automatic Cell Balancing:** Allows all the cells within an individual Battery to be Balanced, and when used with other Antigravity DC-100-V2 batteries to Balance as a Battery Pack within the Group.
- **PLEASE NOTE!** Protections such as the Short-Circuit Protection and Over-Current Protections will prevent the battery from unsafe operation, but they will not at all times protect the battery from damage. It is the User's responsibility to ensure the battery is not used outside the specified operating conditions per this User's Manual. Damage from misuse is not covered by Warranty.
- **PLEASE NOTE!** If BMS Protections are activated the Battery will Shut Off until the Source of the issues is cleared or remedied.



Specifications

	Antigravity DC-100-V2	Specs	Comments
1	Nominal Voltage / Capacity	12.8V /100 Amp Hours 1280 Watt Hours	Lithium-Iron Phosphate Cell is UL1642, IEC62619 certified
2	Dimensions / Weight	330 x 175 x 222 mm (13 x 7 x 8.75 inches) 11.9 kg (26.2 lbs)	Group 31 size, Drop-in Fit
3	Continuous Charge Rate, Safe Charging Temperatures	Recommended 20-60Amps 0°C - 50°C (32°F - 122°F)	Do not exceed 80 Amp Charging or Charge beyond indicated Temps
4	Continuous Discharge Rates, Safe Discharging Temperatures	100 Amps - Continuous* 150 Amps for 1-2 minutes 300 Amps for 4 seconds *Max 200A Continuous for more than two batteries connected in Parallel -20°C - 55°C (-4°F - 131°F)	Beyond these rates the BMS Protections will activate
5	Bluetooth Communication	Version 4.0	Downloadable Free App for Android or Apple
6	Self Power Consumption when not connected and dormant	0.8 milliamp	If not connected to any load, recharge battery every 4-6 months
7	Battery Management System (BMS)	Full BMS protections built-in with Cell Balancing	Battery Cells are UL 1642 and CE 62619 Certified

Load Limitations

- The Antigravity DC-100-V2 is perfectly suited to heavy DC loads within its specifications, but its Battery Management System (BMS) will not allow any load higher than 1400W at 12VDC, or 1200W at 100-240VAC through an Inverter. This is due to the fact that inductive loads, even if rated at 1200W, may not be powered by the Battery because the in-rush current of these devices can often be many times their rated load during their initial start up. Examples of inductive loads are Microwave Ovens and some A/Cs. Please review your system.
- Resistive AC loads (via a suitable 12VDC to 100-240VAC inverter) that can be powered by the Antigravity DC-100-V2 include: toasters, travel kettles, travel irons, hair dryers, heaters, etc (Max 1200W).
- **NOTE:** In the event an AC load higher than 1200W is connected to the DC-100-V2, the battery may shut down and will not power the device, but the battery will not be damaged because its BMS will protect it. In this circumstance the DC-100-V2 will self-reset within seconds to power loads within its Approved power range as noted above.

Installation

1 PRE-INSTALLATION SAFETY PRECAUTIONS

- Remove any metal jewelry or metallic objects from your body before working with any battery.
- Do NOT Short-Circuit the battery! Though the DC-100-V2 has built-in protections for Short-Circuiting, internal damage may result in the event of a Short-Circuit. While this will protect the User, it may still damage the battery internals and is not covered under warranty.
- Do a test fit of your battery or batteries and measure correctly for Wiring needed prior to installation.
- Make sure all wire is of the proper Wire Gauge for your application and loads. Incorrect wire size is UNSAFE.
- Make certain of tight connections. Loose connections generate heat, and is UNSAFE.
- Make certain the appropriate and proper fuses, circuits breakers, and safety precautions are in place when installing and using Batteries in your application. Please check with a Certified Electrician.
- Make sure Polarities are correct for your Parallel or Series connections; failure to do so will damage your battery and/or components.
- Make sure Cable Lugs are directly in contact with battery terminal. No washers should go between the battery terminal and the Cable Lug or Buss Bar connections; this can create resistance.
- DO NOT MIX different Chemistries of Batteries together for your Battery Bank, such as mixing Lead/Acid and Lithium batteries together; they do not charge or discharge at the same rate and will cause damage or UNSAFE CONDITIONS.
- DO NOT MIX Lithium or Lead/Acid batteries of different Amp Hour Capacities. If you intend to use more than 2 batteries together, make certain they are of the same Brand and Capacity to ensure compatibility.
- Disconnect all Loads from the battery when working on or installing batteries. No devices should be connected when installing your batteries. Complete your battery installation first, making sure the battery bank is wired correctly and securely connected before turning on your loads, or devices.
- Make certain there are no sharp or metal objects in any areas of your installation that may cut wires or short-circuit the battery or its connections.

2 INSTALLATION & WARNINGS

Most RV and Deep Cycle installations are Custom fit to the application. We do not go into detailed specific installation instructions for batteries and related items such as fuses, wire gauge sizes, or connections to your loads/devices since each installation is unique. Please follow your equipment manufacturer's guidelines and follow the general methods below to ensure a safe installation.

- When connecting to the Antigravity DC-100-V2 using the nuts and washers provided, we recommend a torque setting of 8Nm. Please connect the Positive (+) connection first before connecting the Negative (-) connection. Disconnections are the reverse process: Negative (-) first, Positive (+) last.
- Prior to installation make sure you have organized the area where your battery will fit and you have room for connections. Make sure there are no sharp areas to cut wires and no metal that could create short-circuit conditions. Be aware that these batteries can output extremely high current although they are only 12v.
- Make sure all connections to and from your battery, and to your chargers and other components, are made with the proper gauge wire/cable for your system! This is imperative or overheating and fire could result.
- Make sure all connections are solid with the correct torque making for a solid connection that won't vibrate loose. Loose connections create overheating and can cause damage or fire.
- Make sure all polarity for your connections is correct, and you have double-checked this. When making a Battery Bank (more than one battery connected) make certain your Polarity Connections are correct and seek professional help if you are not familiar with Serial and/or Parallel Connections, otherwise permanent damage could be caused.
- If making a Battery Bank (more than one battery connected) it is imperative to make sure the batteries are charged to the same state of charge, within .02v of each other before connections in Series or Parallel so that energy levels on Discharge and Charge are matched. Battery Banks need to discharge and recharge in the same capacity level. NEVER MIX BATTERIES OF DIFFERENT CHEMICAL MAKEUPS, DIFFERENT CAPACITIES, OR DIFFERENT BRANDS.
- The Antigravity Battery can be installed in any orientation, but for best heat dissipation it should be installed top up.



Installation (Continued)

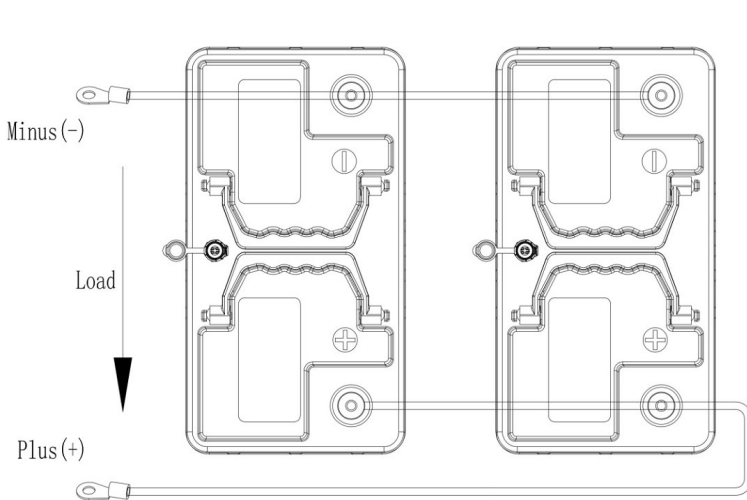
3 CONNECTION OF BATTERIES INTO A BATTERY BANK

- You can connect the Antigravity DC-100-V2 in the Series/Parallel connections as documented below in Fig 1.
- NOTE:** Do not exceed these specifications and make sure only batteries of the same Brand, Amp Hours and Chemical makeups are used in a Battery Bank. All batteries in a battery bank should be charged to within .02v of each other before connecting to ensure they will discharge and recharge at the same capacity.
- In Fig 2 and Fig 3 we demonstrate a typical 2 battery connection in Parallel and Series Connections. If you are unsure of what this represents please contact a Professional for assistance with your installation.

FIG. 1

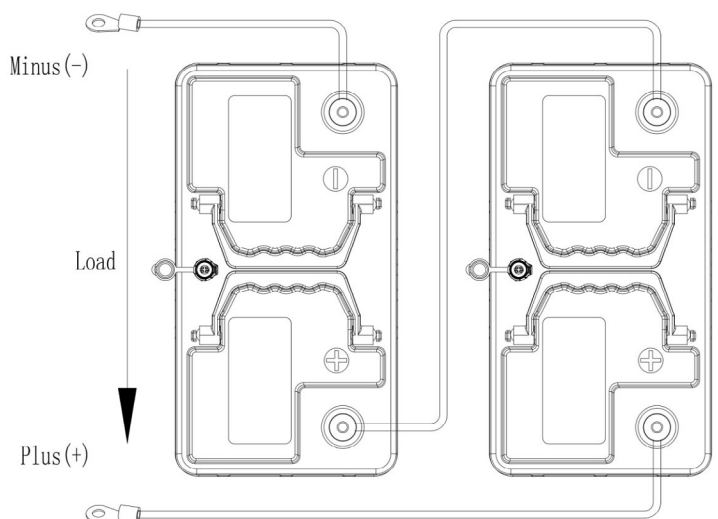
	1 Series (12V)	2 Series (24V)	3 Series (36V)	4 Series (48V)
1 Parallel (100Ah)	YES	YES	YES	YES
2 Parallel (200Ah)	YES	YES	YES	YES
3 Parallel (300Ah)	YES	YES	NO	NO
4 Parallel (400Ah)	YES	YES	NO	NO

FIG. 2 Parallel Connection = 12v with 200 Amp Hours



Series Connection = 24v with 100 Amp Hours

FIG. 3



Charging



IMPORTANT INFORMATION

Charging is a very important aspect of Battery Maintenance. Now that you have opted for a Lithium Battery, your system may or may not need a change for Charging Lithium Batteries. In many cases you can just install your DC-100-V2 Lithium Battery in place of a Lead/Acid Battery, but this does need to be reviewed for your particular system. Below is General Information for Lead/Acid Chargers that allow themselves to be programmed, such as some RV chargers. If you are already using Lithium then you should be good to go, but please review to make sure your charging specs are compatible with our battery for safety and proper operation. If you have an existing Lead/Acid Charger it should meet the requirements set forth below. Please visit our website for further recommendations or information.

In general our Antigravity DC-100-V2 can work as a direct replacement for the lead/acid battery in your system, but in certain circumstances and with certain Chargers it may be required that you also change the Charger for the best and most effective charging of your Lithium battery. Below is some basic information for changes that may or may not be required. So please read and understand the following:

- **For the Bulk or Absorption Charging Stage:** Your Charger should be set in the range of 14.2v-14.6v. This allows the DC-100-V2 battery to get a full charge. NOTE: Going higher than 14.8v can cause our battery to go into protection mode which will cause the battery to not operate normally.
- **For Floating Stage:** Your Charger can be set to 13.6v or lower. In general our batteries do not need a Float Mode so these settings should turn off the float mode from turning on in your system.
- **For Equalization Mode:** Our Batteries do not need Equalization, this can be turned off.
- **Any Temperature Compensation Settings:** This should be set to off or 0. This is not needed and may interfere with our Battery Management System.



BATTERY CHARGING/DISCHARGING PARAMETERS

- Acceptable ambient operating temperatures for Charging: From 0°C-50°C (32°F-122°F)
- Acceptable ambient operating temperatures for Discharging: From -20°C-55°C (-4°F-131°F)
- Acceptable Charging Voltage: Maximum of 14.6V
- Acceptable Charging Amperage: From 20 to 70 Amps. (Recommended Charge at 45-60Amps)
- Battery Over-Charge Protection: 15v
- Battery Over-Discharge Protection: 11.2v - Over-Discharge protections will put battery into Sleep Mode and a charger must be connected to the battery to wake it up.

NOTE: Our advanced Battery Management System (BMS) features a Power Saving mode that saves battery energy and makes the battery more efficient. The energy saving feature will automatically put the battery into a sleep/dormant mode if the battery is not in use, but the battery will wake up immediately if it senses any load or usage requirements. But if the Battery is in a very low state of charge (highly discharged) it will go into a Deep Hibernation mode to protect itself from damage and you must attach the battery to a charger to awaken the battery. If you have reached this point of over-discharge please recharge the battery; allow it to fully charge again.

NOTE: When working with high current charging, make sure all connections are solid with the correct tightness making for a solid connection that will transfer current/voltage without resistance. Loose connections create overheating and can cause damage or fire with any type of system.



Bluetooth App & Operation

1 ANTIGRAVITY BATTERIES DC-100-V2 BLUETOOTH APP

The Antigravity DC-100-V2 Battery is Bluetooth capable and comes with an App that you can use to monitor the status of the Battery easily using your Phone, Tablet, or Computer.

APP FEATURES

- Each Battery has its own unique identifier name (i.e “AG-DC-100 xxxxxxx”).
- Monitor up to 4 Batteries in the App. (You can only view one Battery at a time, but if connected in Series or Parallel you will only need to Monitor one battery since all the batteries are equalized to each other.)
- Monitor the Real-Time Voltage of the Battery.
- Monitor the Current/Amps going into or out of the Battery in Real-Time.
- Monitor the Watt Output of the Battery (Power).
- Monitor the State of Charge Percent (SOC).
- View the Status of the Battery, such as Charging, Discharging or Idle.
- View the interior Temperature of the Battery (Celsius).
- View the individual Cell Voltages.
- View the number of Cycles the Battery has been subject to (potentially).

NOTE: Only one Apple/Android device at a time can be connected to each battery.

2 APP INSTALLATION

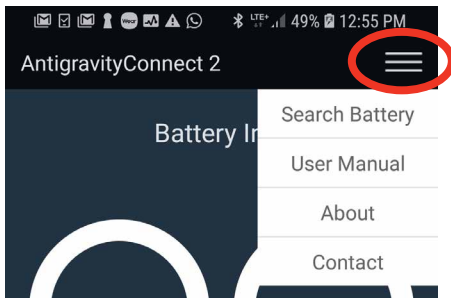
- Simply download the free “AntigravityConnect2” App in the Apple Store, or for Android Devices visit Google Play and search for “AntigravityConnect2”. Go to your Bluetooth Settings on your Phone/Tablet/Device and enable Bluetooth, then open the App you just downloaded for the battery. Allow Location if asked.
- There will be an ICON in the upper right hand corner of the App; click that and select “Search Battery”. It will scan for nearby Bluetooth devices, you will select “AG-DC-100 xxxxxxx” and the App will Pair with the Battery. You need to be within 30ft of the battery, or less. The numbers after the Pairing name are Serial Numbers, each battery has a unique#.
- The App is presented in a basic format to easily see the important details regarding the battery.
- Please note, ONLY ONE DEVICE (Phone, Tablet etc.) can be connected via Bluetooth to a battery at one time or interference and incorrect operation and data will be displayed. Never have two devices connected to the battery or the readings will be inaccurate or not function properly.
- You will need to be within 10m (30ft) or less of the battery for your Device to connect with the Bluetooth signal.
- If you have connected your batteries in Parallel you will only need to look at ONE battery, it does not matter which one, to work out the current and total power for the complete bank. You can multiply or divide by the number of batteries in your bank.



Bluetooth App & Operation (Continued)

3 APP INTERFACE

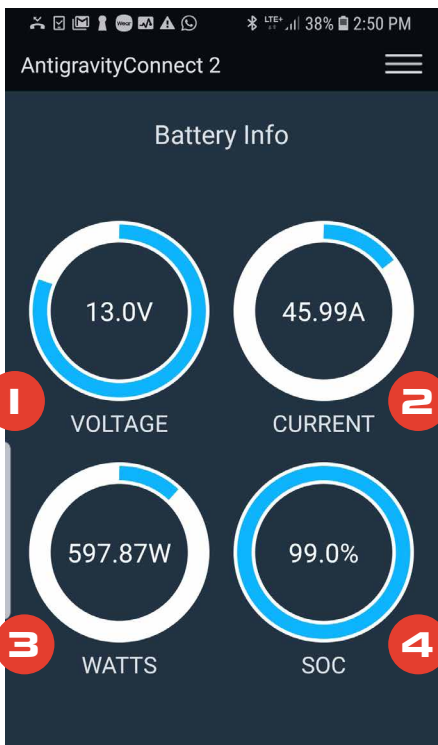
The App has two main pages: "Battery Info" and "Battery Cells".



Or click the MENU icon to access the following:

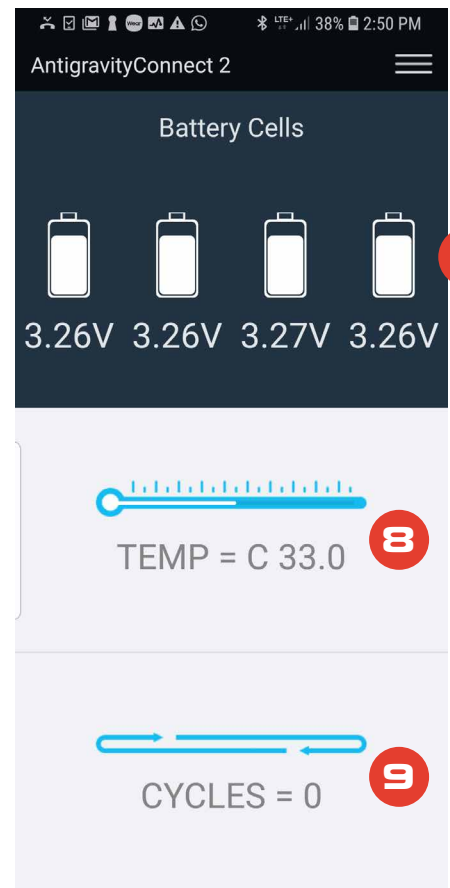
- **Search Battery:** go here to pair batteries with the app.
- **User Manual:** view this manual.
- **About:** get more info by visiting our Deep Cycle Battery Handbook.
- **Contact:** you can email, call or live-chat with us for support!

> BATTERY INFO PAGE



- 1) Real-Time Voltage
 - 2) Real-Time Current/Amps
 - 3) Watt Output (Power)
 - 4) State of Charge %
 - 5) Charging Status
 - 6) Approx. Battery Run Time
 - 7) Voltage for each Cell
 - 8) Temperature inside Battery*
 - 9) Battery Cycles (potentially)
- *Celsius only Reading

BATTERY CELLS PAGE <



Warranty (Non-Transferable)

1 WARRANTY PERIOD

For full Warranty terms and information visit our website's [Warranty page](#).

All warranty claims are handled by Antigravity Batteries directly. The Antigravity Batteries DC-100-V2 battery is supplied with a 10-year limited warranty from the date of purchase (please keep your proof of purchase) or 2000 battery cycles, whichever comes first. Note that a full battery cycle is determined by a fully discharged Antigravity Battery (down to 10% of its gross capacity) and charged to 100%. The 10-year limited warranty period assumes no more than one full cycle per 24hr period. In the event of a valid warranty claim Antigravity Batteries will, at its discretion, supply a new or reconditioned Battery dependent on how many years have passed since the date of purchase or how many cycles the battery has undertaken. All batteries must be registered within the first 30 days from the original purchase date or original purchaser must provide copy of original receipt in order to be eligible for a warranty claim. Warranties are non-transferable. Returns will only be accepted from the original Purchaser.

2 WARRANTY CONDITIONS

- Any warranty claim can only be validated by a proof of purchase, and Registration.
- The warranty is invalid if the battery has been subject to misuse, abuse or physical damage, opened or modified.
- This Antigravity Battery must be of the correct size, design and capacity for the intended Application. Installation in applications above its rated use are subject to warranty denial.
- The battery should be installed and operated at a temperature not exceeding the batteries design limits as noted within the SPECIFICATIONS area of this Manual.
- The warranty shall be voided if the battery becomes unserviceable due to: fire, freezing, abuse, alteration, modification or it suffers from an over-discharged state.
- Installation of the battery must be performed by a responsible adult.
- Warranty will be voided if battery has been opened or security seal has been altered in any way or broken.

3 WARRANTY CLAIM

The Limited Warranty is void either by elapsed time from date of purchase or from conditions mentioned above. For a Warranty Claim, it is the obligation of the original purchaser to:

- 1) Contact Antigravity Batteries and complete the Warranty Claim Form.
- 2) The battery must only be returned in compliance with the transport and packaging regulations ruling at the date of return. Failure to do this may result in the carrier refusing to ship the battery.



Warranty (Continued)



REGISTERING YOUR BATTERY

You must register your Antigravity Battery product in order to validate the Limited Warranty. You can register the product Online at our [Registration](#) page. Complete the requested information and click "send".

Contact Us

When you need help or have questions, our knowledgeable support team is here for you! Please feel free to call us during our Office Hours 7:30am-4pm Pacific Time, Monday-Friday; or you can write to us any time!

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VISIT OUR WEBSITES FOR MORE COOL PRODUCTS, ACCESSORIES AND INFO

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THEMICROSTART.COM

