U1LiFe™

Battery User Manual

INVENTUS POWER™

12V U1-50

(2nd Generation)



Designed & Manufactured by

INVENTUS POWER™

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Applicable Models

Model	Part No. (Manufacturing Location)
12V U1-50	902-09884-001 (Assembled in Mexico; Country of Origin: China)

Document Information

Release Date	Revision	Scope of Change
2025-07-22	V1.4	Update specifications

Environmental Regulations

The battery pack is compliant with the following environmental regulations:

- EU Directive 2011/65/EC for Restriction of Hazardous Substances (RoHS)
- EU Directive 2006/66/EC and its Article 4 amendment of Directive 2013/56/EU on batteries and accumulators and waste batteries and accumulators
- EU Directive 1907/2006 and 2020/2096 on the Registration Evaluation Authorization and Restriction of Chemicals (REACH)
- Management Methods for Controlling Pollution Caused by Electronic Information Products Regulation (China RoHS)

Please read all contents of this User's Manual prior to the installation of Inventus Power U1LiFe™ Batteries.

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Technical Support: For any issues, please email tech_support@inventuspower.com

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Abbreviations

CANOpen	Controller Area Network Bus communication	**CCCV**	Constant Current Constant Voltage
RS485	Standard type of serial communication protocol	**OTC**	Over Temperature Charging
SMBus	System Management Bus	**OTD**	Over Temperature Discharging
OCV	Over Charge Voltage	**TCO**	Thermal Cutoff
AFE	Analog Front End	**SOT**	Safety Over Temperature
BMS	Battery Management System	**SOC**	State of Charge
CC	Constant Current	**OCV**	Open Circuit Voltage
CID	Current Interrupt Device	**RT**	Room Temperature
COV	Cell Over Voltage	**Ah**	Ampere Hour
DOD	Depth of Discharge	**CUV**	Charge Under Voltage
OCC	Over Current Charge	**LED**	Light Emitting Diode

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Safety Information

DO	DO NOT
• Always wear proper personal protective equipment • All installation should be performed by a qualified service technician • Use only insulative tools required for assembly • Dispose of the battery properly in accordance with local, state, and federal regulations • Extinguish any flames with a carbon dioxide, dry- powder fire extinguisher, and cover with copious amounts of water	• Do not connect the battery in series or parallel • Do not short circuit the battery terminals • Do not operate or store the battery beyond the operating limits • Do not over-charge or over-discharge the battery • Do not crush, puncture, or drop the battery • Do not install where liquid is likely to contact the battery terminals or RJ-45 ports. • Do not burn or expose battery to fire • Do not charge battery near flammable materials, liquids, and surfaces • Do not alter, disassemble, modify, or open battery • Do not wear jewelry (i.e. rings, watches, bracelets, necklaces) when handling or working near the battery • Do not lift battery by the terminal cables • Do not operate if battery has been damaged in any way during shipping

Symbol	Definition
	Important safety information will follow.
	DO NOT dispose of battery in fire.
	RECYCLE! Battery may require recycling in accordance with local laws. Regardless, recycling is encouraged. Contact local regulatory authorities for more information. DO NOT include battery with lead acid battery recycling.
	DO NOT dispose of battery in the trash.
	Shock Hazard - Labels may be located on or inside the equipment to alert people that dangerous voltage may be present.
	Burn Hazard - Labels may be located on or inside the equipment to alert people that surface temperature may be dangerous.

Personal Protective Equipment / Installation Tools



Before installation or maintenance of your batteries, the following equipment is required:

- Rubber gloves
- Safety goggles or other eye protection
- Philips Screwdriver
- Voltmeter

Unboxing the Battery

Before You Start

Please read all the safety and warranty information provided in this document prior to installing and/or operating the battery.



IMPORTANT: Remove all jewelry or other metallic objects from your hands and body during the installation and removal of the battery packs and peripherals.

What's in the Box?

- Inventus Power U1LiFe™ battery
- UNDOT 38.2 / IATA approved packaging
- Terminal bolts (pre-installed on battery)
- Rubber battery terminal covers

Note: All power and signal cables must be purchased seperately.

Unpacking

- If possible, do not discard the packaging. This packaging is designed for the safe transportation of lithium-ion batteries compliant with gloabl shipping regulations and can be reused if the battery must be transported to a new location.

Visual Inspection

- Please inspect each battery carefully. Report any damage from shipping to Inventus Power immediately.

Mechanical Features

12V U1-50



#	Description
1	Negative Terminal
2	RJ45 Signal Port #1
3	RJ45 Signal Port #2
4	Positive Terminal
5	LED Fault Indicators (Above RJ-45 Ports)

Battery Serial Number Format

Battery Serial Number Format = TJ[WW]WWWWWWSSSSSYYYYMMDD
Note: Identifier may be 21 or 23 digits

TJ — **Factory Location** (TJ: Tijuana, Mexico)
[WW]WWWWWW — **Work Order Number** (6 or 8 digits)
SSSSS — **Battery Serial Number** (5 digits)
YYYYMMDD — **Manufacturing Date** (Year, Month, and Day)

Product Dimensions

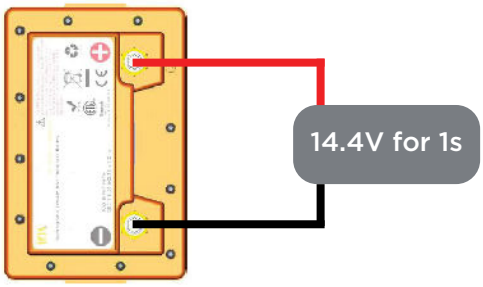
Specification	12V U1-50
Length	208.73±1.00 mm
Width	136.65±0.50 mm
Height	183.50±1.50 mm

Initial Wake-Up

When the U1LiFe™ battery pack arrives from the factory, it is in Shurdown Mode. To exit Shutdown Mode, apply battery charge voltage pulse to the positive and negative terminals for >1 second.

Note: Many intelligent chargers sense voltage at the battery terminals prior to applying charge voltage and thus will not wake the battery from Shutdown Mode. In this case, it is recommended to use a power supply set to the appropriate charge voltage to wake the battery from Shutdown Mode.

12V U1LiFe™ Models



Selecting Power Cables

Choose the appropriate power cable size based on the system load requirements. Cables are rated at ambient temperature of 30°C (86°F) per the table below. When connected in parallel configuration, it is preferable for all cables to be the same length size.

Copper Wire Gauge (AWG)	Metric Wire Cross-Section (mm^2)	Ampacity (A)
14	2.081	20
12	3.309	25
10	5.261	30
8	8.366	50
6	13.302	65
4	21.151	85
3	26.671	100
2	33.632	115
1	42.409	130
0 (1/0)	53.460	150
00 (2/0)	67.400	175

Communication Cables

If your application requires communication, please use any off-the-shelf cable that is compatible with RIA Connector P/N: AJT3518821-030.

Selecting a Battery Charger

A $LiFePo_4$ charger is recommended for max battery life and capacity. Most 2 stage (constant Current / Constant Voltage) Sealed Lead Acid chargers can be used if they meet the following requirements:

- Constant Current (CC) is less than 20 Amps
- Constant Voltage (CV) is 14.2 Volts to 14.7 Volts for the 12V U1LiFe™ batteries
- Float Voltage is within ±0.1V in the Float Charge Voltage table below.

After the charger has been selected, first connect the (-) terminal to the battery, then the (+) terminal.

Charge Voltage / Current

Model	12V U1-50
Charge Voltage	14.4 VDC
Recommended Charge Current	20A (0.4C)
Maximum Charge Current	20A (0.4C)

Float Charge Voltage

Model	12V U1-50
Float Voltage	13.8V

Charger Current

Max charge current rate will vary depending on ambient temperature and battery state of charge. Charging above the recommended current rate may impact the battery cycle life. For more detailed information on charging profile, please discuss with Inventus Techincal Support.

Connecting the Battery

CAUTION: Do not connect batteries with reversed battery leads i.e. with the pack positive terminal connected to the source or system negative terminal or the pack negative terminal connected to the source or system positive terminal. Failure to follow proper connection sequence can damage the battery and void the warranty.

1. Remove power to the vehicle/device prior to installation of the U1LiFe™ battery.
2. Remove all other batteries from the system prior to replacing them with U1LiFe™ batteries.
3. Remove the protective battery terminal covers from the terminals. Retain these covers in the event that you need to remove or move the battery at some future time.
4. Attach the negative cable from the device to the negative terminal on the battery.
5. Attach the positive cable from the device to the positive terminal on the battery.
6. Attach the signal communications cable to the RJ45 ports if needed.
7. If the battery charger is integrated with the device drawing power from the U1LiFe™ battery, then please follow manufacturers recommended sequence for each battery connection.

Please contact Inventus Technical Support if the system requires more than 1 battery.

Tips for Optimizing Performance

- Charge all batteries fully prior to first use of the vehicle/device.
- Use at temperatures below 40ºC.
- Follow maintenance procedures described in this manual.
- Ensure that all batteries are secured into position to minimize damage from shock and vibration.
- Periodically inspect electrical connections to ensure screws are tight and no corrosion is present.

Battery Terminal Torque Rating

Model	Terminal Type	Tool Type	Torque (Nm)
12V U1-50	ISO M6 x 1.0 Bolt	Phillips Drive	3.1 ± 0.3 Nm

CAUTION: When using bolts to engage the battery's threaded holes, use the appropriate number of flat and lock washers to allow for as much thread engagement as possible without bottoming out the bolt. Over-tightening battery terminal bolts could result in damage to battery terminals. Under-tightening battery terminals could result in excessive heating of the terminals.

Module Configuration

Warning: Do not connect in series or parallel. Connecting in series exceeds the voltage limit of the integrated safety protection circuitry and can damage the battery and void the warranty. Connecting in parallel exceeds the current limits of the integrated protection circuitry and can damage the battery and void the warranty.

Note: This battery has terminals always on much like a lead acid battery, so connecting the signal port is not required.

Communications

- Each U1LiFe™ battery uses two RJ45 connectors to support signal communication with the host system.
- Communications are disabled until the battery is awakened by the charger applying a charge voltage.
- Voltage, current, temperature, as well as a variety of other data can be read from the battery using SMBus communication.
- An RJ-45 interface is used as the communication interface between the battery and a connected device.



Top View of RJ-45 Connector

Pin #	Symbol
1	GND
2	RESERVED
3	RESERVED
4	RESERVED
5	RESERVED
6	SCL
7	SDA
8	5V RESERVED

Disconnecting the Battery

CAUTION: Failure to follow proper disconnection sequence can damage the battery and void the warranty.

1. Power off the machine/device prior to the removal of the U1LiFe™ battery.
2. If the battery charger is integrated with the device drawing power from the U1LiFe™ battery, then please follow manufacturers recommended sequence for battery disconnect.
3. Disconnect the communications cable from the RJ45 port if one is attached.
4. Disconnect the positive cable from the positive terminal on the battery.
5. Disconnect the negative cable from the negative terminal on the battery.

Battery Specifications

Specification	12V U1-50
Cell Chemistry	Lithium Iron Phosphate
Voltage *(Nominal / Max Charge)*	12.8V / 14.4V
Energy*	614 Wh / 48Ah
Continuous Discharge Current *(Recommended)*	256W / 20A
Continuous Discharge Current *(Maximum)†*	320W / 25A
Peak Pulse Discharge *(@ 25°C)*	28A < 30 secs
Cycle Life *(Based on cell data @ 25°C)*	3,000 @ 80% DoD
Charge Operating Temperature *(Recommended)*	0°C to +40°C
Charge Operating Temperature *(Maximum Cell Temp)†*	0°C to +60°C
Discharge Operating Temp. *(Recommended)*	-20°C to +60°C
Operating Humidity	20% to 80%
Scalability	None
Weight *(nominal)*	5.22kg (11.50lbs)
Communication	SMBus
Certifications *(Copies of the certifications available upon request)*	UN/DOT 38.3, UL2054, UL/CSA62133-2:20, IEC62133-2:2017, EMC, RoHS, WEEE

*Rated capacity is the total chemical potential energy in the battery. Usable capacity will depend on charge voltage, the depth of discharge, age, and other environmental conditions.

† Operating beyond the recommended continuous currents or recommended operating temperatures may have an impact on cycle life and discharge capacity.

Differences between U1LiFe™ and Sealed Lead Acid batteries

The integrated cell protection and balancing circuitry responsible for the durability and additional safety features of the Inventus Power U1LiFe™ battery, also cause functional behavior that differs from typical lead acid batteries.

Some major differences are:

- No voltage at the terminals does not necessarily indicate a bad battery. With a lead-acid battery, finding no voltage at the terminals often indicates the battery has reached the end of its life. With the U1LiFe™ battery, no voltage at the terminals typically means one of two things; the battery is in "Shutdown Mode" (set when leaving factory) or the cell protection circuitry has interrupted current to protect the battery. Simply connect the battery to a charger to restore voltage to the terminals.
- State of Charge (SOC) with a U1LiFe™ battery appears constant, then drops suddenly. Voltage for a U1LiFe™ remains relatively constant throughout the depth-of-discharge, while voltage for a lead-acid battery decreases at a linear rate. Therefore, determining a U1LiFe™ battery's SOC using the same methods to determine a lead-acid battery's SOC creates the impression that the U1LiFe™ has a full charge then loses power abruptly. A steady voltage across the depth-of discharge is normal behavior for the U1LiFe™. The U1LiFe™ BMS uses custom algorithms to report SOC to the user via SMbus output.
- Inventus Power U1LiFe™ will exhibit 6 to 8 times the cycle life of lead acid batteries.

Cell Balancing

Over time, the cells inside a battery pack diverge in both capacity and State of Charge (SOC). The U1LiFe™ has integrated circuitry to continuously monitor the capacity and SOC of each individual cell string. This information is used to balance the battery and ensure maximum capacity.

Discharge Performance

In typical room temperature, the U1LiFe™ voltage remains virtually flat during discharge and capacity doesn't change significantly, no matter how fast the discharge.

Cycle Life

The U1LiFe™ battery's cycle life is determined by ambient temperature and charge/discharge rates. Under optimal conditions, the U1LiFe™ can deliver thousands of cycles.

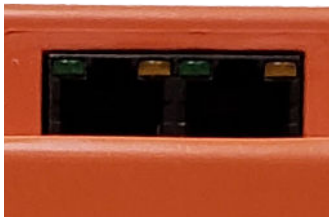
Troubleshooting

Despite the high reliability of the U1LiFe™ battery, you may encounter situations where the battery module does not operate as expected. These situations are typically the result of misuse, abuse or a non-optimal operating or storage environment. If the battery is not operating correctly, you will need to perform the following troubleshooting procedures to fix the issue.

Battery LED Error Status Indicators

Status LED's are located just above the RJ-45 ports. LED's will come on when the following conditions are detected:

Error Description	Green LED	Yellow LED
Over Discharge Current Protection	ON	OFF
Over Charge Current Protection	ON	OFF
Charging Over Temperature Protection	OFF	ON
Discharging Over Temperature Protection	OFF	ON
Charge Over Voltage Protection	ON	ON



Terminal Voltage Absent or Low

Possible Cause(s):

- Protection circuitry is active - Verify all LED's are off.
- The battery is in "Shutdown mode". Shutdown mode will disable output at terminals (voltage reads close to zero) and disable SMBus communications.
- The battery has encountered a Cell Under Voltage condition and has disabled output to terminals and disabled SMBus communication.

Possible Solution(s):

- Connect the battery to a charger momentarily to wake the battery. This will recover terminal voltage and enable SMBus communications. If CUV condition exists, you will need to charge the battery until all cell voltages exceed the CUV limit.

SMBus Not Communicating or Returns Invalid Data

Possible Cause(s):

- RJ45 cable problem.
- The battery is in "Shutdown mode". This is the default mode when leaving the factory. Shutdown mode will disable output at terminals (voltage reads close to zero) and disable SMBus communication.
- The battery has encountered a Cell Under Voltage condition and has disabled output to terminals and disabled SMBus communication.

Possible Solution(s):

- Verify RJ45 cable is connected properly.
- Connect the battery to a charger momentarily to wake the battery. This will recover terminal voltage and enable SMBus communications. If CUV condition exists you will need to charge the battery until all cell voltages exceed the CUV limit.

U1LiFe™ Rapidly Depletes its Energy between Charging

Possible Cause(s):

- The battery is out-of-balance.
- The battery has reached the end of its useful service life.

Possible Solution(s):

- Apply a float charge (13.6 V) for 48 hours to balance the battery pack's cells.
- Replace the battery pack.

Battery Current Disappears when Charging

Possible Cause(s):

- Charging Current too high.
- Charging Voltage too high.
- Battery Temperature too high.
- Cell Over Voltage condition exists.
- Battery is fully charged.

Possible Solution(s):

- Determine error condition if LED's are lit.
- Verify Charging Current is correct.
- Verify Charging Voltage is correct.
- Verify Battery Temperature is within Operating Range.
- Cells may be imbalanced. Apply a float charge (13.6 V) for 48 hours to balance the battery pack's cells.

Voltage Drops Abruptly

- This is normal for $LiFePO_4$ cells. Constant voltage throughout the battery's SOC ensures maximum usable life. Once the Relative State of Charge (RSOC%) goes to 0%, the U1LiFe™ circuitry enables under-voltage protection, which creates an open circuit at the terminals.

Maintenance and Storage

Calibration Cycle

It is recomended to charge the battery to 100% SOC after installation. A full charge and discharge cycle is recommended at least every 6 to 12 months to maintain proper SOC calibration and cell balancing.

Maintenance Charging

U1LiFe™ batteries can be stored in an environment with temperatures between -20°C (-4°F) and +60°C (140°F) and between 10% and 90% relative humidity, non-condensing. For long storage periods it is recommended to check the battery SOC every 6 months. If batteries are stored at 25°C (77°F), charge the battery every 9 months. For storage temperatures above 25°C (77°F), charge the battery every 6 months. It is recommended to charge the batteries when SOC falls below 10%.

Battery Case Visual Inspection

Please perform regular visual inspections of the battery case. If the battery case is found to have dents, discoloration, or appears to be damaged in any way, DISCONTINUE USE IMMEDIATELY. Please contact Inventus Power for assistance with evaluating the product for continued usability.

Voltage Checking

The voltage of the battery can be monitored during normal operation or as part of standard tests performed periodically to assess the health of the battery. If you find the 12V U1 battery voltage under 10V or the 24V U1 battery voltage under 20V at room temperature, the battery has been over-discharged or is self-discharging due to some defect/parasitic load. Discontinue use until the fault can be corrected and the battery can be recharged.

Battery Storage

- Battery should be stored between 30-50% SOC.
- Store in an open, well ventilated, and dry area <30°C for maximum life.
- Do not expose the battery to extreme temperature or sunlight over 60°C (140°F) for sustained durations longer than 48 hours.
- Do not expose the battery to direct sunlight or moisture and/or precipitation.
- Handle each battery carefully to avoid sharp impacts or extreme pressure on the case.
- Do not store a fully discharged battery. Recharge battery after every use.

Minimum Temperature	Maximum Temperature	Duration
-20°C (-4°F)	85°C (185°F)	48 hours
-20°C (-4°F)	60°C (140°F)	1 month
-20°C (-4°F)	35°C (95°F)	3 months
0°C (32°F)	25°C (77°F)	18 months

Transporting Lithium-ion Batteries

This section discusses the regulations governing the transportation of lithium-ion cells and batteries both within the United States and internationally. You should read and understand all relevant regulations discussed in this section before shipping Inventus Power U1LiFe™ batteries.

Lithium batteries are classified as Class 9 when transporting by air or ground. When shipping by air, all lithium batteries are required to have a 30% state of charge or less. Lithium batteries with capacity greater than 300 Wh and exceed 30kg (66lbs), are considered Class 9 when shipping by ground. For more information on shipping Lithium Batteries, please see your freight carrier's requirements.

NOTE: The regulations discussed in this manual apply to lithium-ion cells and batteries. Once the Inventus Power U1LiFe™ battery is integrated into a host system, the host may be subject to additional transportation regulations that require additional certification testing. Since Inventus Power cannot anticipate every possible configuration and application of the U1LiFe™ you must verify that your U1LiFe™ powered host product is compliant with all local ordinances and regulations.

Transporting Batteries for Installation

- Place the battery terminal protective caps on the battery terminals prior to removing the battery from its current location, to prevent accidental shorts or arcing from occurring if a terminal touches a metal object.
- Battery handle must be in the close position prior to assembly.
- Avoid heavy vibration during transportation.
- Avoid throwing, dropping, rolling and excessive stacking during loading and transportation.
- Make sure that all cables and external connectors are disconnected and properly removed from the battery prior to transporting it.
- Do not hang or hook battery handle with sharp device or at one corner only.

Transporting Batteries to a Different Location

If the battery needs to be shipped to a different location or sent back to Inventus Power for any reason:

1. Disconnect all cables, both power and communications from the batteries.
   (reference section "Disconnecting the Battery" for proper disconnection procedure)

2. Place the protective caps on the battery terminals prior to removing the battery from its current location, to prevent accidental shorts or arcing from occurring if a terminal touches a metal object.

3. All large lithium-ion batteries are considered "Dangerous Goods" by the US Department of Transportation, and as a result, transporting them by common carrier (whether by ground or by air) requires compliance with UN DOT regulations UN3480, Class 9 - "Dangerous Goods".

4. Pack the batteries in "Dangerous Goods" certified boxes and packaging materials as specified by the Department of Transportation (DOT). The packaging must protect the contents from reasonable handling damage and prevent short circuits from taking place. Ideally, one would use the original box if it's still in good condition.

5. The package should be prepared for shipment and shipping documents should be signed by an individual who is certified to handle and prepare the paperwork and products that have been designated as "Dangerous Goods" for shipment.



IMPORTANT: The U1LiFe™ battery is shipped in a specially designed box to provide maximum protection for the contents. We strongly recommend that you save this box and use it whenever you need to transport or ship the battery. Please follow all local laws/regulations regarding the shipment of lithium-Ion batteries.

Following UN and DOT Regulations

Failure to comply with UN and DOT regulations while transporting Class 9 Hazardous Materials (Dangerous Goods) may result in substantial civil and criminal penalties.

Emergency and First Aid Procedures

Emergency Procedures for a Smoking Battery

- If a battery begins to smoke or melt, remove charging source immediately.
- If possible, move the battery to a well-ventilated area, preferably outside.
- Submerse in water or douse with copious amounts of water.

First Aid Procedures for Human Contact/Exposure to Battery Content

In the event of exposure to battery contents, the following could occur:

- Vapor or mist could irritate eyes, mucous membranes and/or respiratory tract
- Irritation to eyes and skin
- Exposure can cause nausea, dizziness or headache.

In case of contact with the battery's electrolyte:

- Immediately flush eyes with copious amounts of water for at least 15 minutes
- Assure adequate flushing of the eyes by separating the eyelids with fingers
- Flush skin with water
- Remove and wash contaminated clothing promptly
- If inhaled, remove oneself to fresh air
- If swallowed, wash out mouth with water
- If not breathing or having difficulty breathing, seek first aid

Serial Number Record

Please record both the serial number and date of purchase and store this in a safe place for future reference.

Serial Number		**Date of Purchase**	
Serial Number		**Date of Purchase**	
Serial Number		**Date of Purchase**	
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Serial Number		**Date of Purchase**	

Warranty Violations



CAUTION: Performing any of the following actions will immediately void your warranty on the product and could lead to a potentially dangerous situation

1. Breaking the lid and exposing the circuit boards and battery assemblies.
2. Incorrect battery wiring and/or installation. Verify polarity at all connections with a standard voltmeter
3. Operating the battery in an environment where the temperature exceeds the specified limits.
4. Modifying or tampering with the M6 power terminals, RJ45 connector, communication interface, and internal data logging functions.
5. Connecting the U1LiFe™ battery in a series configuration.
6. Incorrect battery bank sizing.
7. Verify polarity at all connections with a standard voltmeter (1) before energizing the system and (2) on batteries with threaded connections, before switching the built-in circuit breaker to the “ON” position.
8. Pairing the battery with incompatible equipment. Use of accessories not recommended or sold by the manufacturer may result in a risk of fire, electric shock, or injury to persons and will Void the Warranty.
9. Exceeding the maximum continuous discharge rate or charge rate can damage and void the U1LiFe™ battery.

Inventus does NOT cover product damage caused by mishandling or improper use per the Installation Manual, Integration Guides and Warranty, exposure to liquids, impacts from falling objects or being dropped, or attempts to repair the battery by any party other than Inventus.

The complete list of Warranty Exclusions is included in the Inventus Power Battery Warranty document:

If you believe that in the course of using the U1LiFe™ battery, you will conflict with any of the above listed conditions or any other safety precautions listed in this manual, please DO NOT proceed any further.

Contact Inventus Power immediately for guidance and information.

Recycling

Inventus Power batteries are recyclable and should not be disposed of as household or landfill waste. Do not incinerate or dispose of the battery. Return end-of-life or defective batteries to your nearest recycling center as per the appropriate local regulations. For information about recycling, please visit our website at: **www.inventuspower.com**

The EPA classifies spent batteries as “universal wastes” instead of “dangerous goods.” The shipping requirements for universal wastes are available at the EPA website at: **www.epa.gov**

Technical Support

If you have any technical questions regarding the U1LiFe™ battery, please contact our service support team at:

Phone: +1.877.423.4242

E-mail: tech_support@inventuspower.com



CALIFORNIA PROPOSITION 65 WARNING

WARNING: Lithium-ion Batteries and/or products that contain Lithium-ion Batteries can expose you to chemicals including cobalt lithium nickel oxide, and nickel, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information, go to www.P65Warnings.ca.gov

WARNING: Electrical cords, cables, product cords, wire assemblies, and carrying cases made with PVC can expose you to chemicals including DEHP, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information, go to www.P65Warnings.ca.gov

WARNING: Plastic cases and product plastic housings made from polycarbonate or other plastics can expose you to chemicals including bisphenol A, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information, go to www.P65Warnings.ca.gov

Appendix A - Electrochemical Performance and Durability

Model	12V U1-50
Rated Capacity*	48Ah
Capacity Fade (%)	≤5%
Power	0.26kW (continuous)
Power Fade (%)	≤5%
Internal Resistance (ohms)	≤0.025Ω
Resistance Increase (%)	≤25%
Energy Round Trip Efficiency *(Based on Wh loss)*	95%
Energy Round Trip Efficiency Fade (%)	≤5%
Cycle Life *(Based on cell data at 25° and 80% DoD)*	3,000 cycles

*Rated capacity is the total chemical potential energy in the battery. Usable capacity will depend on charge voltage, the depth of discharge, age, and other environmental conditions.