

KiloVault® 2V 1000Ah XLC Advanced AGM Battery



Installation and User Manual

Revision 1.0 - 09/2022



****WARNING High Voltage Risk of Personal Injury or Death****

As is the case with all batteries, the risk of shock is present. When handling batteries, use protective measures including, but not limited to, safety glasses, insulated gloves, and protective footwear.

When working with or installing batteries, use electrically insulated gloves and tools. Remove personal metal items such as watches, rings, bracelets, etc.

The information included in this manual is accurate at the time of publication. However, this manual is subject to change without prior notice as we continuously improve our products.

Additionally, the illustrations in this manual are for demonstration only and are intended to help explain the KiloVault® XLC system concepts and installation instructions. Details may vary slightly depending upon the market region and the product version.

Please note: If this unit is installed by someone other than the end-user, the installer must explain the contents of this installation and user manual to the end-user.

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About the XLC Battery

Features

- No watering required which means greater peace of mind at remote off-grid locations.
- Low self-discharge rate and no off-gassing allow for safe and worry-free operation.
- Excellent charging acceptance and super fast charge/discharge performance. Plus, good recovery on deep discharge.
- Maximized Cycle Life: Affordable high performance with 2500 cycles @ 50% depth of discharge
- Versatile operation and set up in Smart Grids, Hybrid Power Supply Systems, Street Lamp Power Systems, and Micro Grids.
- Exceptional PSoC Performance: Advanced technology with specially formulated carbon additive that enhances the overall battery life
- 3 Year Limited Warranty

Contact Us

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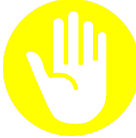
Documentation can be downloaded from the KiloVault website: <https://kilovault.com/>

Safety Information

As is the case with all batteries, the risk of shock is present. When handling batteries, use protective measures including, but not limited to, safety glasses, insulated gloves, and protective footwear.

When working with or installing batteries, use electrically insulated gloves and tools. Remove personal metal items such as watches, rings, bracelets, etc.

Symbols Used in this Manual

	Warning: Indicates a condition that can cause personal risk or injury.
	Caution: Indicates a condition that can cause equipment damage.
	Note: Indicates points of interest of particular emphasis that make operation more efficient or convenient.
	Disclaimer: Indicates information limiting the scope of responsibility.

Warnings



High Voltage Risk. Improper use may cause personal injury or death.

Do not use a battery that appears damaged in any way.

All batteries present the risk of shock, use protective measures when handling. When working with or installing batteries use electrically insulated gloves and tools. Remove personal metal items such as watches, rings, bracelets, etc.

High voltage connections of batteries (configurations of greater than 36 V DC nominal) are dangerous. DC voltages over 52 V can stop the adult human heart and a fully charged 48 V nominal system is over this level. Use appropriate safety measures including the removal of



metal personal items and insulated gloves.

A small risk of spark exists while making electrical connections.

Ensure the installation area is free of explosive gases and liquids.

Ensure the batteries are not installed in confined areas containing explosive substances. This includes flammable fuel-powered machinery, holding tanks, pipe fittings, and connectors.

In the unlikely event of a fire, when possible first shut off the source of electricity. Keep class ABC extinguishers close to your power generating equipment and are best suited for multipurpose fire types such as wood, flammable liquids, and electrical appliances.

Respiratory irritation may be caused if the battery is punctured or cracked.

Skin contact with a punctured or otherwise open battery can irritate the skin.

To avoid the risk of shock or fire, ensure all wires are properly sized and in good condition.

Verify all equipment to be connected to the batteries is turned off before making any electrical connections.

Do not submerge the batteries. This can cause personal injury and will void your warranty.

Do not attempt to disassemble the batteries. This can cause personal injury and will void your warranty.

KiloVault® batteries can be used in RV applications for electrical appliances ONLY. They can NOT be used to crank over motors in such vehicles.

Installation

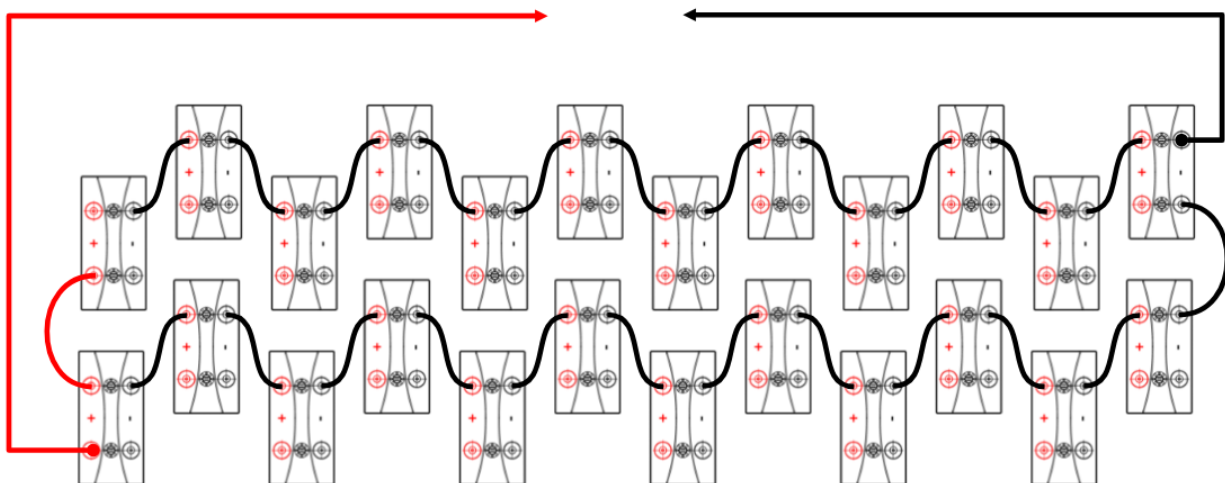
In addition to the General Safety Precautions and Instructions, the following guidelines should be observed when handling the KiloVault® 2V 1000 XLC:

- The batteries should be installed in a dry and clean environment to ensure system and personal safety.
- Flammable, explosive and similar dangerous materials or devices are prohibited in the same room . The installation room should be equipped with fire suppression equipment (such as CO 2 fire extinguishers).
- The batteries weigh 135 lbs (61.2 kg) each, so keep in mind the structural load of the building and floor and any other structural weight limitations.
- Relative humidity: 0% 95% RH , non condensing
- Avoid heat and direct sunlight, avoid high humidity (with condensation) environments.
- The installation location should be ventilated to avoid accumulation of hydrogen and avoid risk of explosion

Configuration

The KiloVault XLC series of batteries can be used in 12 V, 24 V, 36 V and 48 V configurations where 6, 12, 18 or 24 batteries are connected in series, plus to minus, in a row. Please see this example of 2, 24 V, parallel strings

Example Wiring Diagram - 2, 24V strings in parallel



The maximum number of batteries in a bank is limited to 96, 4 parallel strings of 24 batteries in series, creating a 48 V, 4000 Ah battery bank.



All wire/cables must be the appropriate gauge and construction to handle the loads that will be placed upon it. Heavy gauge, fine stranded copper wire is the industry standard. A minimum of 2/0 or 4/0 AWG copper cable is recommended for battery interconnect cables.

The cables connecting batteries in series into rows must be the same length. The cables connecting the rows in parallel must be the same length. The home run cables to the inverter must be the same length. Cables of different lengths will cause voltage differences in your battery bank. The rows in your battery bank must be kept within 0.2 V of each other to ensure that they work correctly and that large currents between rows aren't generated.

Operation

Charging & Discharging

KiloVault 2V 1000 XLC batteries are usually charged using a three-stage charging cycle: bulk, absorption, and float stages. Bulk is a constant-current stage. The purpose of the bulk stage is to raise the battery voltage to a relatively high level with an initial fast charge. Absorption is a constant voltage stage. It is established upon reaching the absorb voltage settings.

The battery is considered to be full when the following conditions are met:

- The charge current must taper down to a level between 1% and 2% of the total battery amp-hours while maintaining the absorption voltage. The charger can then exit absorption and enter the next stage, float. The float stage is a maintenance stage that ensures the battery remains fully charged.

Not all chargers are designed or programmed the same way. Please use the following settings for plug-in chargers, inverter/chargers, and charge controllers.

Setting	Values - Volts are per battery in a single string. Current is per string in parallel
Absorb End Current	25 A or 0.025C
Absorb Time	8 to 10 hours
Absorb Voltage	2.35 V to 2.4 V/cell
Battery Capacity	1000 Ah
Battery Temperature Compensation	-4 mv/cell/°C
Battery Type	AGM
Bulk Voltage	2.35 V to 2.4 V/cell
Charge Cycle	3 Stage without a solar charge controller 2 stage with a solar charge controller
Charge End Current	Zero A
Charging time	12 to 15 hours

Default Battery Temperature	25°C
Equalization Voltage	2.35 to 2.40 V
Float End Current	10 A or 0.01C
Float Voltage	2.25 V
Max Bulk Current	200 A
Maximum Charge Current	200 A
Maximum Discharge Current and Time	500 A (5s)
Recharge / Re-Bulk Volts for 50% DoD at 77°F (25°C)	2.0 V
Recommended Charge Current	200 A
Peukert Coefficient	1.27

Storage and Recommissioning

Generally speaking, lead sulfate will be produced on the battery negative plates when they are stored for a long time. KiloVault® 2V 1000 XLC batteries can be stored for up to 6 months, before needing a freshening charge. Because lead sulfate is an electrical insulator, it negatively affects the performance of the battery. We recommend the following recharge schedule based on storage temperatures.

If a battery is stored under 50°F (10°C) for 6 months, the state of charge will drop approximately 10%. You can recharge it up to 100% capacity using the normal charging instructions.

If it is stored between 50°F and 86°F (10°C to 30°C) for 6 months, the state of charge will drop approximately 30%. Recharge it up to 100% capacity using the following directions.

- If charging between 8 to 10 hours, charge at a constant 2.45 V, limited to 0.05C.
- If charging between 10 and 20 hours, charge at a constant 2.45 V, limited to 0.1C.
- If charging between 20 hours and 3 days, charge at a constant 2.45V, current limited to 0.25C
- If charging more than 3 days, charge at a constant 2.25V, current limited to 0.25C

If it is stored between 86°F and 104°F (30°C and 40°C) for 6 months, the state of charge will drop approximately 40%. Recharge it up to 100% capacity using the instructions above.

If it is stored above 104°F (40°C) for 6 months, the state of charge will drop 50% or more. Recharging will often fail to recover 100% of the capacity. Do not store the battery in these conditions.

Specifications - Electrical

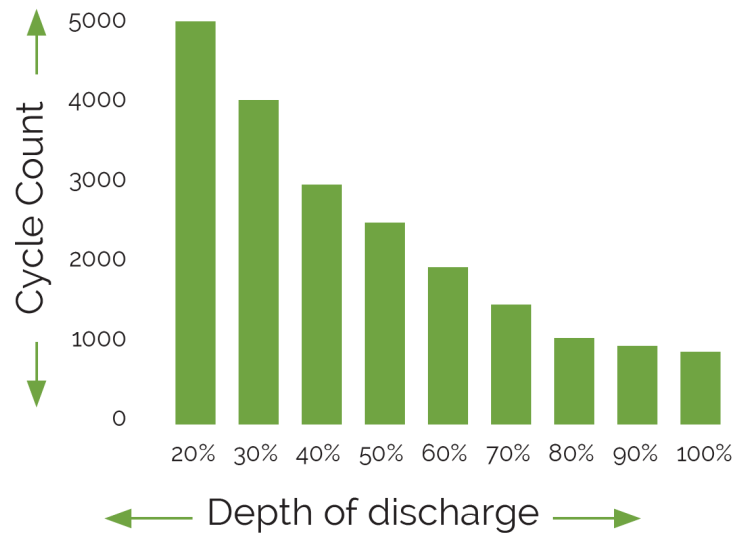
Specification	Value
Model	2V 1000 XLC
Capacity - Watt-Hours	2000 Wh
Capacity - Amp-Hours *	1000 Ah

Cycle Life	2500 Cycles at 50% DoD
Internal Resistance @ 25°C	Approx.0.25mΩ
Maximum Bank Configuration	12V: 6 Batteries in series per string (Max 24) 24V: 12 Batteries in series per string (Max 48) 48V: 24 Batteries in series per string (Max 96)
Maximum Continuous Charge Current	200 A per string
Maximum Continuous Discharge Current	400 A per string
Peak Discharge Current and Time Limitation	500 A per string for 5 seconds
Maximum Time Between Full Charges	Batteries can be stored up to 6 months at 25°C (77°F) before a freshening charge is required. For higher temperatures, the time interval will be shorter.
Peukert Coefficient	1.27
Rated Voltage	2 V
Self-Discharge Rate	≤4% per month at 25°C - Up to 6 months at 25°C (77°F) before a freshening charge is required. For higher temperatures, the time interval will be shorter.

Discharge in Hours	1	3	5	10	20
*Rated Ah Capacity @ 25°C/77°F	510	750	850	1000	1040

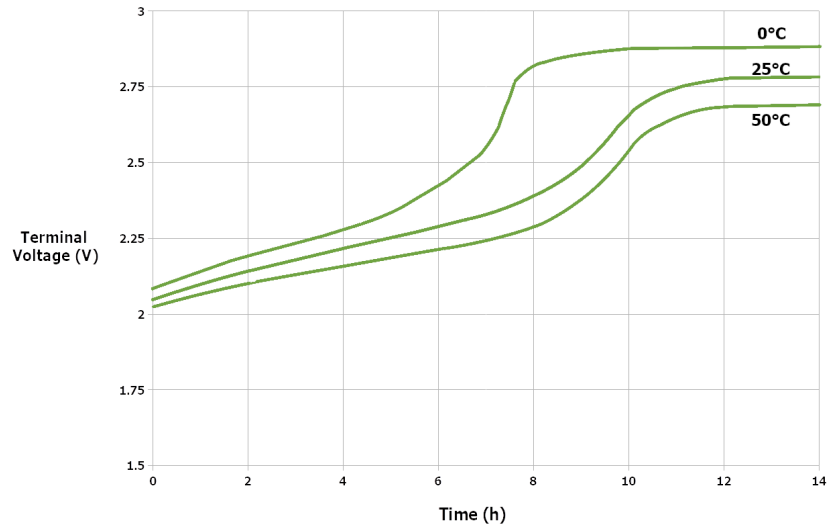
Cycle Life

The cycle service life of the battery is related to the frequency of discharge, the depth of discharge (DoD), the floating voltage, and the working environment. Total cycle life decreases with increasing temperatures and depths of discharge.

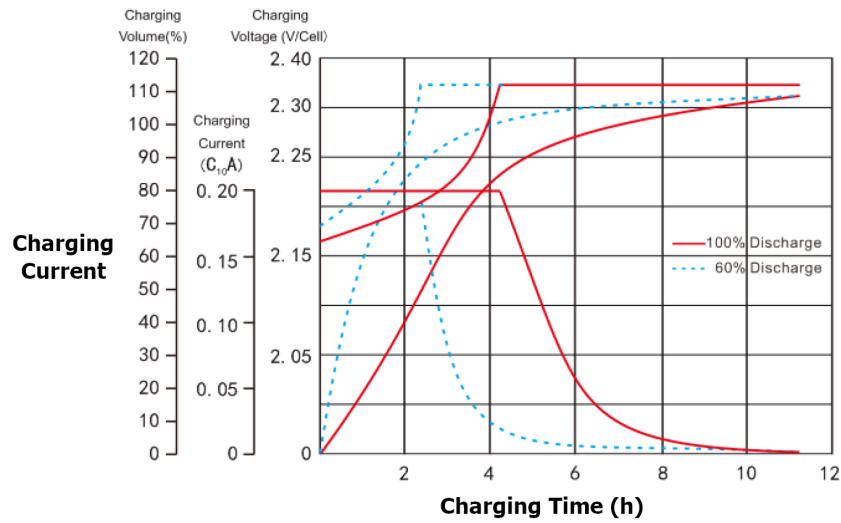


Charging Characteristics

Constant Current Charge



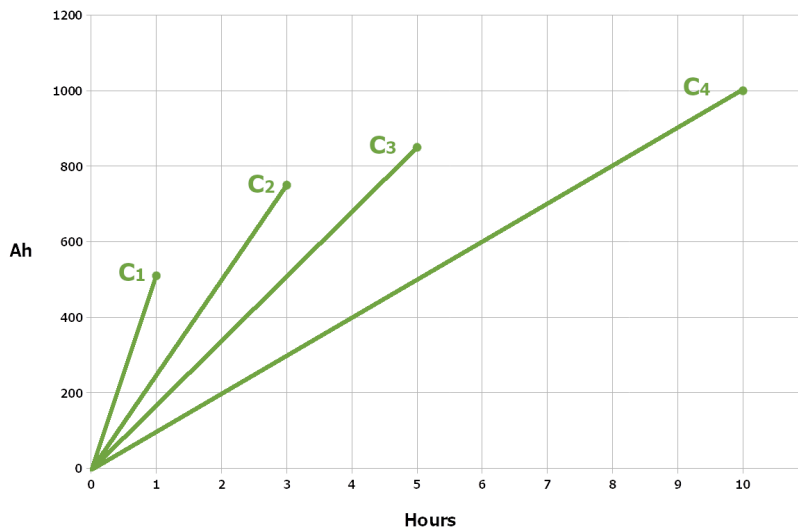
Constant Voltage Charge



Discharge Characteristics

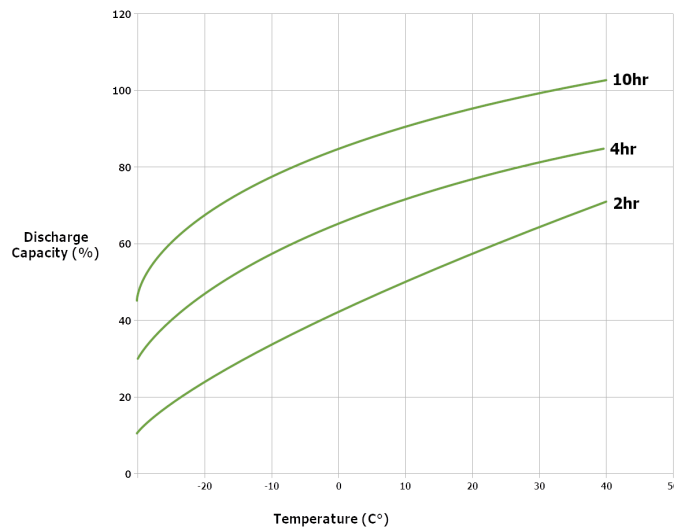
Discharge at Different Discharge Currents

Battery capacity depends on the discharge current or discharge rate. The smaller the discharge current, the larger the discharge capacity. The larger the discharge current, the smaller the discharge capacity.



Temperature vs. Capacity

Battery capacity increases with the temperature. The size of the effect the temperature has is affected by the discharge current / discharge rate. This effect becomes more obvious when the battery is discharged at a larger current.



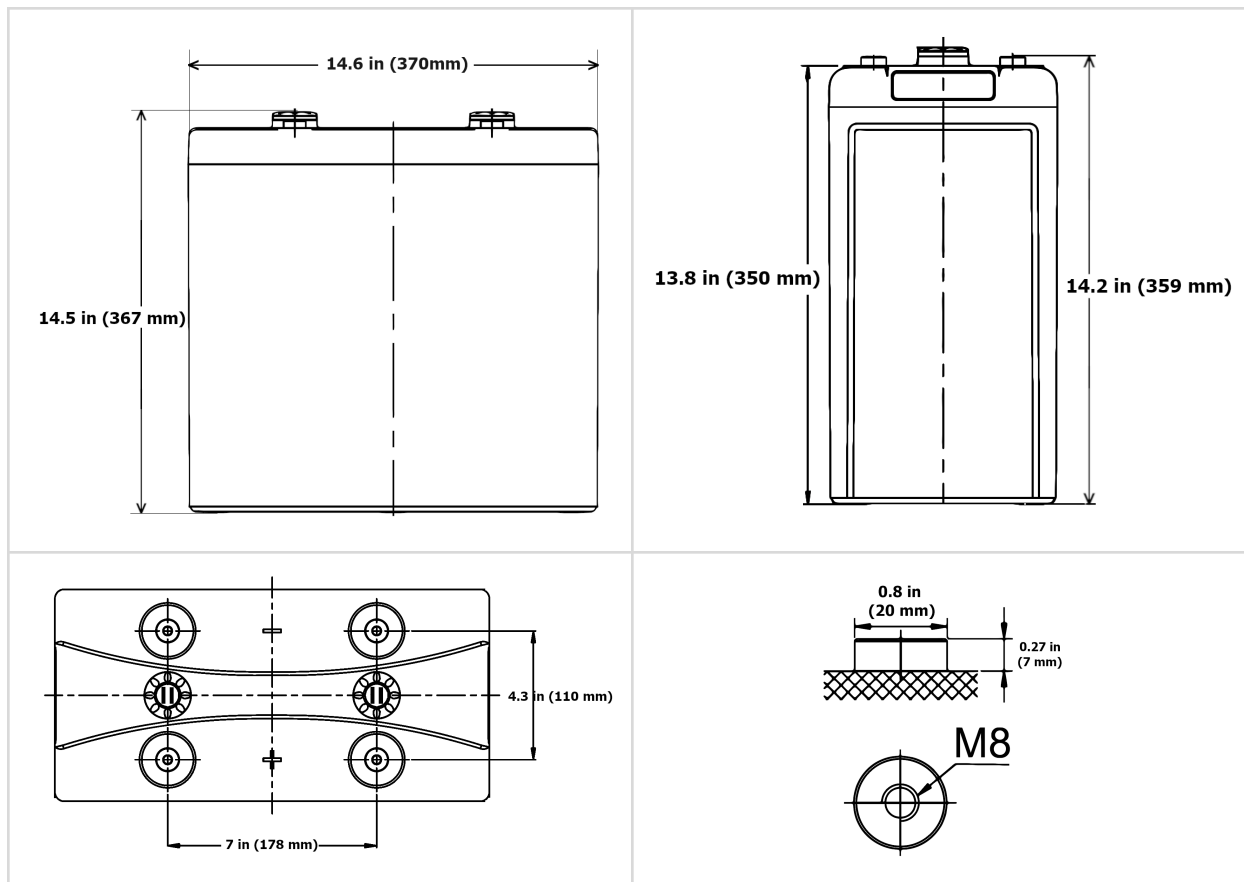
Environmental

Specification	Value
Maximum Altitude	5000 ft (1500m)
Recommended Humidity	0% to 95% , Non-condensing
Temperature Range - Nominal Overall Operating	77° +/- 5°F (25° +/- 3°C)
Temperature Range - Charging	32°F to 104°F (0°C to 40°C)
Temperature Range - Discharging	-4°F to 131°F (-20°C to 55°C)
Temperature Range - Storage	-4°F to 122°F (-20°C to 50°C)

Physical

Specification	Value
Case Length	14.6 in (370mm)
Case Width	7.1 in (181mm)
Case Height	13.8 in (350mm)
Total Height	14.4 in (365mm)
Orientation	Flat on its widest side with the terminals facing forward or flat on its end with the terminals facing upward.
Spacing	Batteries can be right next to each other, side by side. 15 in (40 cm) around the battery bank. 20 in (50 cm) above the battery bank.
Terminal Torque	113 in-lbs (13Nm) +/- 5%
Terminal Size	M8 (Bolts and Washers Included)
Weight	135 lbs (61.2 kg)

Dimensioned Drawings



Certifications

- IEC 61437
- BS EN 61427

Environmental Protection

Toxic/Poison Checklist

Battery Component	Presence of Toxic and/or Poisonous Substances						
	Cu	Pb	Hg	Cd	Cr(IV)	PBB	PBDE
Terminals	Present	Not Present	Not Present	Not Present	Not Present	Not Present	Not Present

Container	Not Present	Not Present	Not Present	Not Present	Not Present	Not Present	Not Present
Inner Materials	Not Present	Present	Not Present	Not Present	Not Present	Not Present	Not Present

Recycling



This battery cannot be disposed of with other waste. In order to prevent the release of potentially hazardous substances, risks to the environment, and risks to human health from improper hazardous waste disposal, do not throw away this battery in the general waste stream. Please recycle it.



In order to recycle this battery, please use your local recycling system or contact your waste management authority for the proper lead-acid battery recycling procedures in your area.

Warranty

Warranty	3 Year Limited
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