Addendum to VX-1 Li/Li+ Owner's Manual to Include Lithium Battery Products

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Addendum to VX-1 Li/Li+ Owner's Manual to Include Lithium Battery Products

VX-1 Li (30 Ah LiFePO4)
VX-1 Li+ (42 Ah LiFePO4)

LONG-TERM CARE OF YOUR BATTERY

Regular use of your VX-1 Li/Li+ will optimize the life of your battery through the on-board systems in your VX-1 Li/Li+. Consistent charging and discharging of your battery will allow your Charger and Motor Controller to work together to keep your battery working properly.

Potential damage to your battery can occur through long periods of non-use and non-charging. While idle and turned "OFF", your VX-1 Li/Li+ continues to draw a small amount of current from your battery.

It is essential to the long-term reliability of your VX-1 Li/Li+ battery to keep it charged regularly, even during winter or off-season.

YOU NEED TO FULLY CHARGE YOUR VX-1 AT LEAST <u>ONCE</u> <u>PER</u> <u>MONTH</u>.

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BATTERY PACK

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DESCRIPTION OF BATTERY PACK

The proper care of your battery pack is essential for maximum VX-1 Li/Li+ performance. The battery has a nominal bus voltage of 128 volts DC which, if not respected, could result in serious injury. Only an authorized service agent is qualified to have access to the battery pack.

Your battery pack consists of two boxes located within the Vectrix frame. Only an authorized service agent is qualified to troubleshoot a battery-related issue. The chemistry of the LiFePO4 is such that each cell has a nominal voltage of 3.2V. Your battery pack consists of four modules of 10 cells each connected in series to provide a nominal battery bus voltage of 128 volts. The battery comes in two models—30Ah and 42Ah. The footprint of each cell is identical, however, the 42Ah cells are taller.

A sophisticated battery management system (BMS) monitors each cell for optimum performance. The BMS consists of a circuit board fastened directly to the top of each cell in a 10 string module. There is no need for the consumer to access the BMS.

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BATTERY PACK, CON'T
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DESCRIPTION OF BATTERY PACK

The battery pack needs to be kept within distinct operating temperature limits. The battery includes fans built into the battery, which draws cool air through the battery boxes. The fans run in response to temperature and are active while the VX-1 Li/Li+ is running and while charging the battery. You will detect the sound of the fans when they are operating. This is normal.

WARNING!
Opening the battery compartment is dangerous. Doing so will void your warranty. **DO NOT OPEN!**

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CHARGING THE LITHIUM BATTERY

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The VX-1 Li/Li+ comes standard with a 2.4m (8 ft) charging cord which is located in the trunk under the passenger seat. The male connector on the charging cord is specific to the country of use. See your authorized Vectrix dealer if a specialized male connector is required for public charging stations unique to your area.

Use extension cords only when necessary and only on a temporary basis (See **Appendix A**).

To charge the VX-1 Li/Li+ open the trunk, remove the cord, close the trunk taking care to route the cord in the designated slot in the trunk ring, and plug the VX-1 Li/Li+ into an appropriate 110v/60Hz or 220v/50Hz outlet. Once plugged, in the onboard charger will automatically control the charging process. During the charging process, the dashboard LCDs will be active. As the charge progresses, the battery level indicator on the right LCD will increase in level in response to state of charge (SOC) of the battery.

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CHARGING THE LITHIUM BATTERY, CON'T

The on-board charger will shut itself and the entire VX-1 Li/Li+ off when the charging process is complete. The charging process may be interrupted at any point. You should plug it in whenever it is convenient to do so. This is referred to as Opportunity Charging. The VX-1 Li/Li+ will benefit by any amount of opportunity charging.

The on-board battery charger monitors the status/condition of the battery during normal operations as well as charging. The battery is part of an integrated system of temperature and voltage monitoring.

The charger will detect any imbalance among the cells of the battery and will automatically perform an "Equalization Charge" of the battery. Such an event will be seamless to the operator except that the charge time will be extended beyond the typical charging time. The Equalization Charge is part of the long-term care of your battery. The Equalization Charge can be interrupted at any time and will resume during the next charge.

If you have been running the VX-1 Li/Li+ for a long period of time and your battery is at a high temperature, the battery charger will automatically detect the high temperature when plugged in and will initiate a cooling process before charging. Please note that this will increase the overall charge time.

WARNING!
Use extreme caution when dealing with electricity. Do not charge in rain or snow, or on wet surfaces.

WARNING!
The Battery Pack is rated at 128 volts, 30 or 42 Amp hours. Contact with the terminals of the Battery Pack can result in injury or death

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CHARGING DELAY

The VX-1 Li/Li+ has a feature that allows you to plug in the VX-1 Li/Li+ but delay the charging process. This enables you to take advantage of lower "off-peak" electrical rates during charging.
To set a pre-charge delay:

If plugged in:

1: Unplug the bike.

2: Turn on the bike.

3: Press and hold the "SELECT (S)" button on the right side of dashboard until you see the "Set Delay" mode activated on the left LCD.

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CHARGING DELAY, CON'T

4: Set the delay using the "H" and "M" buttons.

EXAMPLE:

Program Delay set to **7** hours **30** minutes

Press and hold "H" to increment by 1 hour, Press and hold "M" to increase in 15 minute increments. The maximum delay you can set is 9 hours, after that it will go back to 0.

5: Once you are finished press and hold the "SELECT (S)" button until you see "done" flash briefly on the left LCD and the normal display returns.

6: Enable the programmed delay by pulling the **left** brake lever **while turning off the ignition key.**

7: Alternatively, you can enable a fixed 30 minute delay by pulling the **right** lever **while turning off the ignition key**.

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SPECIFICATIONS
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WEIGHT:
VX-1 Li 425 lbs (193 kg)
VX-1 Li+ 460 lbs (209 kg)

BATTERY TYPE:
VX-1 Li/Li+ Lithium Iron Phosphate (LiFePO4)

RATED BATTERY CAPACITY:
VX-1 Li 30 Ah, 3.7 kW-h
VX-1 Li+ 42 Ah, 5.4 kW-h

RATED BATTERY VOLTAGE:
128V

CHARGER:
1.5 kW on-board battery charger

CHARGE REQUIREMENTS:
110V-220V (50/60Hz)

CHARGE TIME (80% CHARGE/No equalization):
VX-1 Li = up to 3-4 hours
VX-1 Li+ = up to 4-6 hours

BATTERY DEEP DISCHARGE CYCLES (80% DOD @ 1C):
VX-1 Li/Li+ up to 1,500

ESTIMATED BATTERY LIFE:
VX-1 Li/Li+ = up to 50,000 miles/80,000 km

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PERFORMANCE DATA
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MAX SPEED:
VX-1 Li/Li+ 68 mph/110 km/h

ACCELERATION:
VX-1 Li 0-50 mph (80 km/h) in 6.0 seconds
VX-1 Li+ 0-50 mph (80 km/h) in 6.25 seconds

**Acceleration varies depending on vehicle weight, load, road surface conditions, and state of charge.*

RANGE:
VX-1 Li up to 40-60 miles* (64-96 km*)
VX-1 Li+ up to 55-85 miles* (88-136 km*)

**Range varies depending on speed, rider weight, topography, and riding habits.*

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APPENDIX

A: EXTENSION CORD WARNINGS

* Use polarized extension cords.
* Replace cracked or worn extension cords with new.
* Insert plugs fully so that no part of the prongs are exposed when the extension cord is in use.
* When disconnecting cords, pull the plug rather than the cord itself.
* Teach children not to play with plugs and outlets.
* Use only three-wire extension cords with three-prong plugs. Never remove the third (round or U-shaped) prong, which is a safety feature designed to reduce the risk of shock and electrocution.
* Check the plug and the body of the extension cord while the cord is in use. Noticeable warming of these plastic parts is expected when cords are being used at their maximum rating, however, if the cord feels hot or if there is a softening of the plastic, this is a warning that the plug wires or connections are failing and that the extension cord should be discarded and replaced.
* Never use an extension cord while it is coiled or looped. Never cover any part of an extension cord with newspapers, clothing, rugs, or any objects while the cord is in use. Never place an extension cord where it is likely to be damaged by heavy furniture or foot traffic.
* Don't use staples or nails to attach extension cords to a baseboard or to another surface. This could damage the cord and present a shock or fire hazard.
* Use special, heavy duty extension cords for the high wattage 1500W on-board charger.
* When charging outdoors, use only extension cords labeled for outdoor use.

NOTICE: Definitions of cable designations are derived from UL designation scheme as defined in the National Electrical Code NEC)—NFPA-7.

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