Hubble Lithium and Victron Energy

The Hubble Lithium range of LiFePO4 batteries is compatible with Victron products for various system types.

Requirements

1. Hubble Battery
2. Hubble CloudLink & Cables (if not already integrated in a + model)
3. Victron Type A BMS Cable
4. Laptop or Cellphone
5. Victron GX Device (Recommend Cerbo or Ekrano GX)

Requires CloudLink

All Hubble batteries require a Cloudlink for full and official support with Victron. The Blade+ is the first Hubble battery available with a CloudLink built in. The rest of the range will be available with built-in CloudLink in the future, indicated by a “+” symbol on model number eg. AM-5+, AM-2+, X101+ and so on.

External CloudLinks are available for batteries without a CloudLink built-in.

The CloudLink's primary role is to implement dynamic and adaptive voltage and current control as well as to implement the extended Victron CAN bus protocol. Beyond that, the CloudLink provides a powerful dashboard with extremely high resolution logging (some in more detail than is available in VRM).

NOTE: Support from Hubble for Victron is only provided where their batteries are used with a CloudLink. Hubble batteries used with Victron without a CloudLink are not supported.

Parallel Limitations

Each CloudLink can support 15 batteries in parallel and 15 CloudLinks can be paralleled. Thus, a total of 225 modules can be paralleled. In the case of an AM-10, 225 modules can be paralleled for a total of 2.3MWh of capacity.

For assistance with installs that require more than 15 modules, please contact Hubble support.

Note: The first batch of AM-10's are limited to 8 in parallel. There very few of these batteries in the field.

Minimum Battery Sizing

Hubble makes batteries available in two chemistries: LiNiMnCoO2 (NMC) and LiFePO4 (LFP).

The benefit of the NMC batteries is they can deliver higher instantaneous power (their cells have a better C-rating) than the LFP batteries. The benefit of the LFP cells is that they have a better cycle life but at the expense of slightly lower C-rating.

This gives the system designer choices. If budget is the priority, then using an NMC battery like the AM-2 paired with a MultiPlus-II 5kVA (1:1) will result in a reliable solution. The lower instantaneous power characteristics of the LFP battery, like the AM-5 mean it would be better to put 2 x AM-5 with a single MultiPlus-II 5kVA or 8kVA (2:1 or 1:0.8).

Thus, the guidance (*) we give to system designers on Battery:Inverter ratio is:

Chemistry	Guideline
NMC	Battery Max Discharge kW : Inverter kVA should be at least 1:1
LFP	Battery Max Discharge kW : Inverter kVA should be > 1:1

(*) Note: that the C-rating of the battery must be observed, so with the AM-16+ which has a discharge C-rating of 0.5C, the battery kWh of 16 is twice as high as the Max Discharge power at 8kW.

Required Firmware Versions

Device	Minimum Required Version
CloudLink	>= 4.60
GX	>= 3.00
VE.Bus	Current release recommended

WARNING: Please ensure the CloudLink and the GX device are updated before beginning the installation.

Electrical Connection

Hubble batteries have built-in pre-charge resistors to help manage the in-rush currents like those generated by the capacitor banks in Victron low frequency inverters.

When installed in parallel and used with 5kW inverters or smaller, the batteries can be daisy chained but negative and positive leads must be drawn diagonally across the bank. Links between battery bank and the inverter must be fused.

When installed in parallel and used with inverters larger than 5kW, each battery must be individually wired to a busbar. Each battery must be fused between the busbar and the battery.

Commissioning

Matched Systems

Where the Single Battery Module : Total Inverter ratio is >= 1:1 eg. an AM-10 on a MultiPlus-II 5kVA (2:1) or an AM-2 on a Quattro-II 5kVA (1:1), then it is possible to commission the inverter directly from the battery

Before turning on the batteries, inverters or commissioning the system, the batteries must be connected to the DC bus with the fuses closed.

If possible, the inverters must be powered up from the AC input before turning the batteries on.

If AC input is not available, the batteries can be turned on and the internal pre-charge resistor should be able to energise the DC bus and charge the capacitors in the inverters.

Larger Systems

For larger systems where the Single Battery Module : Total Inverter capacity is < 1:1 eg. 4 x 5.5kWh AM-2 on a Quattro 15kVA (0.33:1), then the connections between each inverter and the DC bus must be open during commissioning and an external pre-charge resistor must be used to commission each inverter one at a time.

Configure the CloudLink

The two methods for configuring the CloudLink are documented in the CloudLink manual:

1. local config via config mode which sets up a local WiFi Access Point
2. by setting up a hotspot called 'RIOT_WiFi' with password 'CloudLink' which the CloudLink will automatically connect to and configuring via remote console on the CloudLink portal

The local config option is necessary where no Internet access is available and can be used to setup a CloudLink where the CloudLink portal is not needed by the installer.

Communication Cabling

The Victron VE.Can to CAN-bus BMS **type A** Cable 1.8m (ASS030710018) is recommended for all CloudLink-based installations:

Function	Victron VE.Can side	Battery side
GND	Pin 3	Pin 6
CAN-L	Pin 8	Pin 5
CAN-H	Pin 7	Pin 4

The external CloudLink (not the internal model in the + batteries) can, however, be used with either the type A and the type B cable.

Configure for Victron

1. Hold the mode button on the CloudLink (beeps once) and wait for 2 consecutive beeps after 5 seconds
2. Connect your phone or laptop to the wireless network “RIOT CL-XXXXXXXXXXX” (no password)
3. Navigate to http://192.168.4.1 (type the full address including the http:///)
4. Click menu, choose the Device Settings tab ⇒
    1. CAN Mode ⇒ Victron
    2. CAN Conn. To ⇒ Inverter
    3. Serial Conn. To ⇒ Battery (External CloudLink only)
    4. RS232 Conn. To ⇒ Nothing (+ models with internal CloudLink only)
    5. Adaptive Cell Limits ⇒ Enable
    6. Save & Confirm
5. Site Settings ⇒
    1. Inverter Brand ⇒ Victron
    2. (Optional) Add the IP address of the GX device - improves CloudLink display
    3. Save & Confirm
    4. Wait for Confirmation, scroll down and click Reboot for the settings to take effect

Connect the Battery side of the type A cable into the CloudLink CAN port. Connect the Victron side of the type A cable to the CAN BMS port on the GX device (configured for 500kbps CAN BMS). The Hubble battery will display in the device list of the GX device.

Victron Configuration

During normal operation, the charger/inverter and any MPPTs are controlled by the BMS (CloudLink). Charge voltage (CVL), charge current (CCL) and discharge current (DCL) parameters as specified in the Victron CAN bus protocol are published by the CloudLink to control the Victron system.

The charge voltages provided in the tables below are specified as “safe” values which are reliable fallback values in the event of an interruption to BMS control. The actual charge voltages issued to the GX device by the CloudLink are slightly higher and are dynamically adjusted based on the internal status of the battery.

The values below are configured using Ve.Configure 3 for VE.Bus devices and VictronConnect for RS devices and MPPTs.

Venus OS > DVCC

DVCC is forced on by the GX device if the Hubble has been correctly connected and identified. If DVCC is not forced on, please contact Hubble support.

In normal operation, the defaults in DVCC can used. Hubble support may require that DVCC options are use during troubleshooting.

- Limit charge current: Off
- Limit managed battery charge voltage: Off
- SVS - Shared voltage sense: Off
- STS - Shared temperature sense: Forced off
- SCS - Shared current sense: Off
- Controlling BMS: Automatic selection

VictronConnect

Use VictronConnect to configure Victron MPPTs and the RS range of inverter/chargers like the Victron Multi RS.

Multi RS

1. Click the Settings icon top right
2. Click the Battery menu
    1. Battery capacity: Use 100Ah per Hubble battery (excl. AM-10: 200Ah, AM-3: 50Ah, S-200: 200Ah, Blade: 137Ah). Eg. If there are 3 x AM-4, then capacity is 300Ah.
    2. Battery preset ⇒ Select preset ⇒ Smart Lithium (LiFePO4)
    3. Dynamic cut off ⇒ Disabled
    4. Low battery shutdown ⇒ Set this to the cutoff value from the tables below
    5. Low battery restart & alarm ⇒ Set this to the restart value from the tables below
    6. Charge detect ⇒ Set this to the sustain value from the tables below
    7. Absorption voltage ⇒ Set this to the charge value from the tables below
    8. Float voltage ⇒ Disabled or set this to the charge value from the tables below
    9. Storage voltage ⇒ Disabled or set this to the charge value from the tables below

MPPT & MPPT RS

1. Click the Settings icon top right
2. Click the Battery menu
    1. Battery preset ⇒ Select preset ⇒ Smart Lithium (LiFePO4)
    2. Absorption voltage ⇒ Set this to the charge value from the tables below
    3. Float voltage ⇒ Set this to the charge value from the tables below

Ve.Configure 3

Use Ve.Configure 3 (Windows only) to configure the VE.Bus generation of charger/inverters like the Victron MultiPlus-II or Quattro.

1. On the charger tab, select Battery type ⇒ Lithium Iron Phosphate (LiFePO4) batteries
    1. Change the Absorption and Float voltages to match the fallback values from the tables below

2. On the inverter tab, set the fallback values from the tables below for
    1. DC input low shut-down
    2. DC input low restart
    3. DC input low pre-alarm
3. For ESS systems, select Battery system ⇒ System uses LiFePO4 with other type BMS
    1. Battery capacity: Use 100Ah per Hubble battery (excl. AM-10: 200Ah, AM-3: 50Ah, S-200: 200Ah, Blade: 137Ah). Eg. If there are 3 x AM-4, then capacity is 300Ah.
    2. Sustain voltage, set the value from the tables below
    3. Dynamic cutoff, use the low cutoff value from the tables below
    4. Restart offset, set the value from the tables below

Fallback Voltage Parameters

Value	Description
Charge	Charger and MPPT Absorption and Float voltages
Cutoff	Inverter Low Voltage Cutoff and ESS Dynamic Cutoff voltage
Restart	Inverter Low Voltage Restart & Pre-Alarm
Sustain	ESS Sustain voltage

48V

Chemistry	Charge	Cutoff	Restart	Sustain	Models
LiNiMnCo (NMC)	53.3V	44.2V	46.2V	47.0V	AM-2, AM-3, X101
LiFePO4 (LFP)	56.0V	40.0V	50.0V	50.0V	AM-5, AM-10, AM-16, Blade
LiFePO4 (LFP)	51.0V	40.0V	47.0V	47.0V	X-100

24V

Chemistry	Charge	Cutoff	Restart	Sustain	Models
LiNiMnCo (NMC)	28.7V	23.8V	24.9V	25.3V	AM-4

12V

Chemistry	Charge	Cutoff	Restart	Sustain	Models
LiFePO4 (LFP)	14.0V	11.6V	12.5V	12.5V	S-100/A, S-120, S-200/A

Support

Hubble support is most effective for Victron installers via telephone at +27 21 554 7773. A ticket will be created if the call is not answered, and Hubble will call back.

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