U-Charge® XP Power System

User's Guide

Please read all contents of this User's Guide prior to the installation of U-Charge® XP power systems.

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1. CONTACT INFORMATION

Customer Support:
8 AM to 5 PM CST
1-888-VALENCE (USA Customers Only)
1-888-825-3623

For North America Support
1-888-825-3623

For European, Middle East, Africa , Asia, and Australia Support
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1-888-825-3623

Fax:
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u-charge@valence.com

Support Email:
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Mailing Address:
Valence Technology, Inc.
12201 Technology Blvd.
Suite 150
Austin, TX 78727

2. SAFETY INFORMATION

The U-Charge® XP power system must be used in accordance with the manufacturer's specifications and guidelines for recommended use. When used properly and in accordance with these instructions, the battery/power system is a safe, reliable and convenient energy storage solution.

CAUTION: Misuse or abuse of the U-Charge® XP power system may result in personal injury or fire.

- Keep all original packaging. International law dictates that the batteries are shipped under UN 3090, Class 9 rules for hazardous goods/ dangerous materials.
- Burn Hazard.
- Abusive operation of the battery (e.g., overcharge, crush, puncture, excessive heat or moisture) may produce smoke. In such an event, ventilate the area.
- Extinguish any flames with copious amounts of water, use a carbon dioxide, dry-powder fire extinguisher, or cover with sand or mud (therefore removing excess oxygen from the flame).
- DO NOT disassemble, crush, puncture, or incinerate.
- DO NOT short circuit external contacts.
- DO NOT expose to temperatures above 60ºC (140ºF).
- NEVER charge the battery without charge protection circuitry and equipment approved by Valence Technology.
- Remove all jewelry or other metallic objects during the installation of the battery.
- Exercise care in handling any charged battery, particularly when placing it inside a container with metal objects.
- DO NOT throw the battery away in the trash.
- Dispose of the battery properly in accordance with local regulations. Visit the Rechargeable Battery Recycling Corporation's website at www.rbrc.com for more information.
- DO NOT use with other types of batteries connected in series or parallel with the U-Charge® XP power systems.

Your battery may contain symbols, defined as follows:

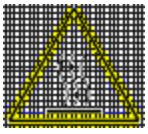
Symbol	Definition
	Important safety information will follow.
	DO NOT disposed of battery in a fire.
	RECYCLE! Battery may require recycling in accordance with local laws. Regardless recycling is encouraged. Contact local regulatory authorities for more information. DO NOT include battery with lead acid 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 temperatures may be dangerous.

Table 1 : Symbol Definitions

Internal Protection Features

The U-Charge® XP power system has several safety features built-in to help protect against the effect of abusive conditions:

- Valence Lithium Phosphate technology in every cell provides lithium-ion advantages of high energy, light weight, and long cycle life without the fear of thermal runaway under abuse conditions.
- Communications to the U-BMS, a separate battery management device that is used to monitor up to 30 batteries.
- Cell voltages and internal temperature monitored by each battery.
- LED status lights on the battery gives visual indication of battery condition.

3. BEFORE YOU START

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

The U-Charge® XP power system should be professionally installed and handled. Please contact Valence Customer Support for free consultation if you have any questions about the handling, operation and safe use of this battery before proceeding further.

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. Puncturing or otherwise physically damaging the battery casing, circuit boards, battery cells or any other part of the battery mechanism.
3. Operating the battery in an environment where the temperature is higher than 60°C (140°F).

If you believe that in the course of using the U-Charge® power system, 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 Valence Technology immediately for guidance and information.

Visual Inspection

Please inspect each battery carefully. Report any damage from shipping to Valence Technology, Inc. immediately.

System Configuration Limits:

	12 Volt Battery System	18 Volt Battery System
Maximum System Voltage	450 V	450V
Maximum Number of Batteries in Series	30 Batteries	20 Batteries

Table 2: System Configuration

Valence Technology defines battery components and batteries as follows:

- **Cell** - A single battery cell representing 3.2 V.
- **Cell Block** - A group of cells configured in parallel.
- **Battery (**U-Charge® XP power system) - A single battery made up of 4 to 6 cell blocks in series.
- **Battery Pack** - A group of batteries attached in series or in parallel.

4. CONTENTS/TOOLS REQUIRED

Model	Mounting hardware	Quantity	Wrench Required	Torque
U1-12XP	¼”-20 thread/ terminal washer/ spring washer	2 each	7/16 inch	12.4 Nm (110 in-lbs)
U24-12XP	M8* 1.25-12/ terminal washer/ spring washer	2 each	13 mm	18 Nm (160 in-lbs)
U27-12XP	M8* 1.25-12/ terminal washer/ spring washer	2 each	13 mm	18 Nm (160 in-lbs)
UEV-18XP	M8* 1.25-12/ terminal washer/ spring washer	2 each	13 mm	18 Nm (160 in-lbs)

Table 3: Hardware and Torque Information

5. INSTALLATION

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

Turn off power to the vehicle/device prior to installation of the U-Charge® power system(s). Remove all other batteries from the system prior to replacing them with the U-Charge® batteries.

Tips

- Do not install U-Charge® XP power systems above heat generating equipment.
- Ensure that all U-Charge® XP power systems are at same state of charge prior to connecting together. Contact Valence Support for suggestions on how to perform this task.
- Use flexible insulated copper cables, like welding cable, or equivalent bus bar for serial or parallel power connections.

Since these batteries are sealed and have no free electolyte, they can be mounted in any orientation, although right side up is recommended.

Figure 1.

If the battery must be mounted on its side to fit in the application, we recommend the terminals be positioned towards the top of the battery.

Figure 2.

For safe operation of the U-Charge ® XP power system, it is required that the U-BMS (HV or LV) model, a battery management system, be used in conjunction with the U-Charge® XP power system battery or battery pack. For instructions on how to install the U-BMS, see the user's guide included with that product.

Installation Steps for Basic Hook Up

1. Fasten all battery packs in position via means supplied in the vehicle/device.
2. Attach negative cable from the vehicle/device to the negative terminal on the first battery.
3. Attach a jumper cable between the positive terminal in the first battery pack and the negative terminal on the second battery pack. (Note: the jumper cable must be the same gauge cable as the positive and negative terminal cables.)

Installation Steps for a Battery Pack or Multiple Battery Installation

1. Add additional jumpers to complete the series string as depicted in Figure 3.
2. For higher current applications, one can use parallel configurations of batteries.
3. Batteries must be connected in parallel before the series string is connected as depicted in Figure 4.
4. Please contact Valence Support if the system includes more than 30 batteries.

Note: Batteries should be at the same state of charge when wiring them in parallel.

5. Attach the positive cable from the LINE (discharge) contactor to the positive terminal of the final battery.

Series Installation

Batteries are configured in a series when increased voltage is needed. As shown below, three batteries are connected with jumpers. For example, assume these are 12V batteries. Connecting them in this configuration results in added voltage to yield 36V but the capacity stays the same.

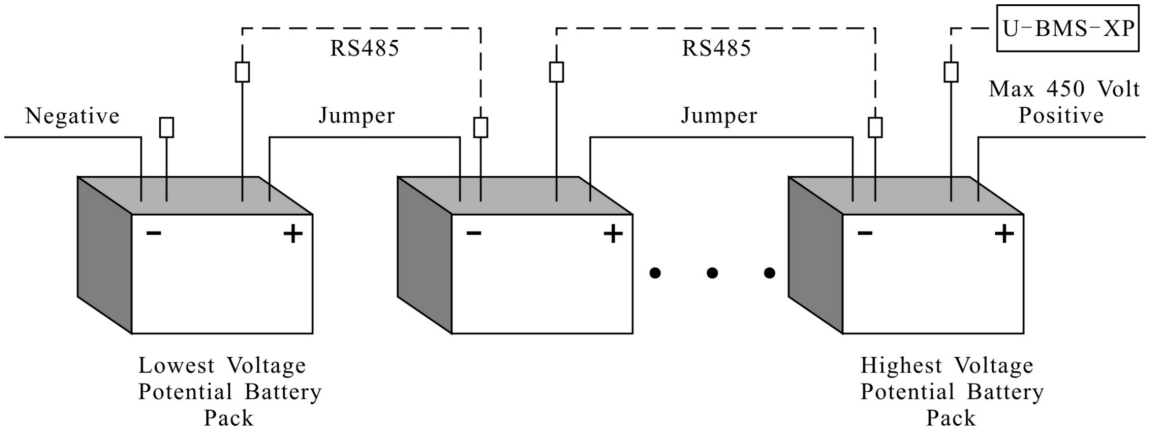


Figure 3: Installation of U-Charge® XP Power Systems in Series.

Because different batteries have the positive terminal on different sides, ignore the proximity of the U-BMS connection to the positive terminal, rather the point is to show that the U-BMS should be connected to the most positive battery in the string.

ParallelInstallation

The module configuration in Figure 4 shows a simultaneous parallel and series format. The parallel configuration allows for capacity to increase while voltage remains the same.

Parallel& Series Installation

As shown in Figure 4, a combination of the parallel and series format allows for increased capacity and voltage resulting in longer run time. For example, if each battery shown below is a 12V battery, the combined parallel and series installation will result in 36V and twice the capacity.

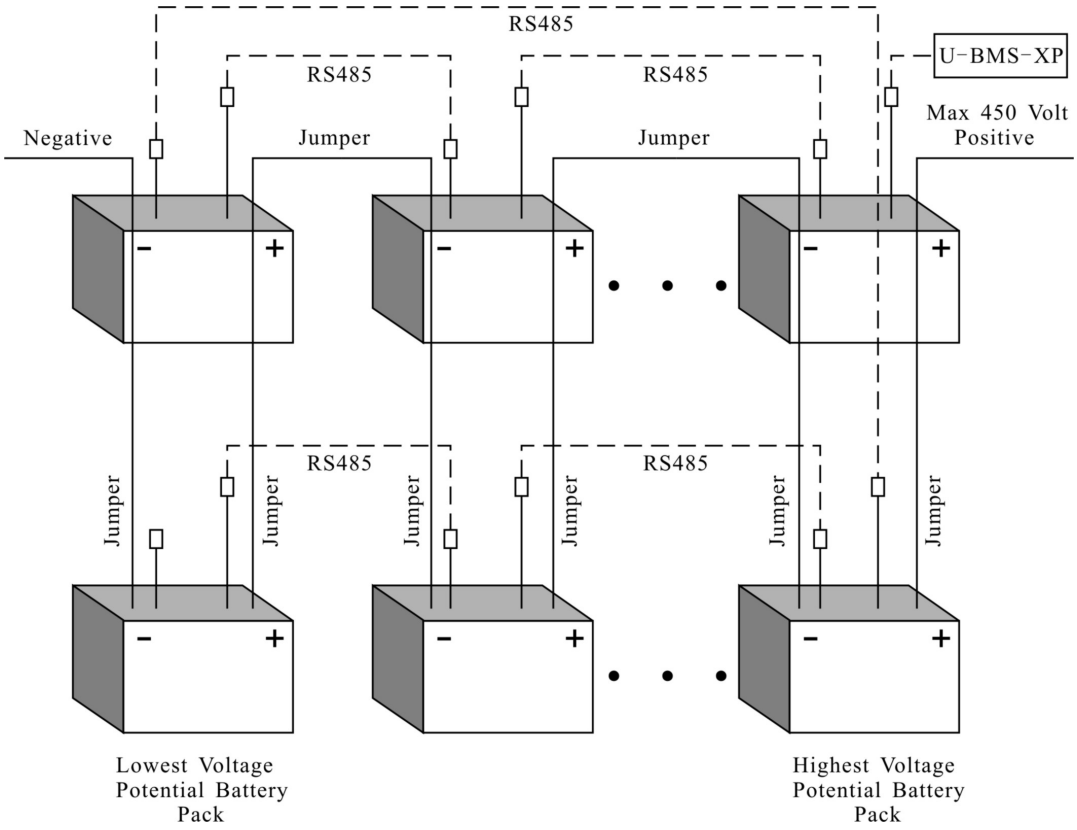


Figure 4. Installation of U-Charge ® XP Power Systems in Parallel and in Series.

Ensure that parallel connections between batteries are completed prior to connecting the batteries in series.

Module to U-BMS Communications

A RS-485 bus is used as the communication method between a module and its U-BMS. Each battery contains one male and one female M12 connector which are wired in parallel to make it possible to daisy-chain communication cables. Figure 5 and Table 4 describe the pin-out of the two 5-pin M12 connectors:

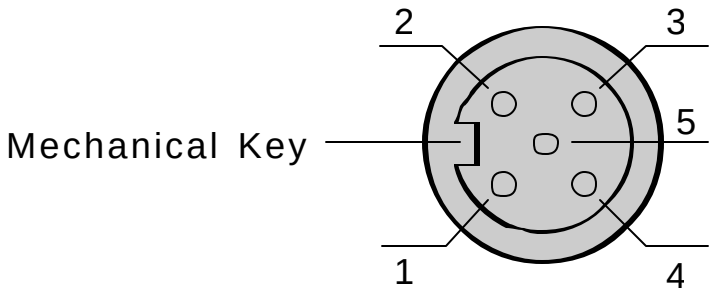


Figure 5. Female Type M12 Connector

Pin	Signal Name	Pin Type	Description
1	N/A	N/A	Shield
2	VCC (+5)	Power	Power supply for the RS-485 transceiver
3	GROUND	Power	Ground for the RS-485 transceiver
4	B(+)	Signal	B signal from the RS-485 transceiver
5	A (-)	Signal	A signal from the RS-485 transceiver

Table 4: Pin-out of the RS-485 Communication Ports in U-Charge® XP Power System

6. CHARGING THE BATTERIES

The U-Charge® XP power systems can be connected in series and/or parallel. The U-BMS will communicate with the individual battery in the system along with a charger (not included with the U-Charge® XP power system or the U-BMS).

Select a Proper Battery Charger
When choosing a charger please use the following minimum guidelines for selection.

- The charger should deliver DC current with as small a ripple current as possible.
- The charger should have a reliable and accurate voltage regulator.
- The current from the charger should be controlled in all situations.

Charging the Battery
Follow the charging algorithm in Figure 6. For normal charging, use a battery charger that is able to begin charge at C/2 current or less (20A or less for the U1, 50A or less for the U24, 65A or less for the U27, and 30A or less for a UEV for each in parallel) and then automatically taper current down to maintain constant Optimum Float Voltage. If possible, select a charger with a three stage output (Constant Current - Constant Voltage – Float Voltage). Charging is considered complete when the current is less than C/20 for the system. However, leaving the batteries on float will continue to balance the cells and will not harm the batteries in any way.

FOR BEST RESULTS leave the batteries on float all of the time. For normal charges, the battery temperature should be between 0 and 45°C (32 and 113°F). Internal resistance of the battery is higher at colder temperatures, so the charge acceptance of the battery will be less than when it is at 0°C (32°F). This may increase the charge time.

The value of the charger's voltage limit should be calculated by multiplying the number of U-Charge® power systems that are connected in series with the maximum voltage of each module (see specs in Section 7).

For example:
12 battery of the U1-12XP (U24/U27) systems * 14.6V= 175.2V (see Figure 7 for example)
or
12 battery of the UEV-18XP systems* 21.9V= 262.8V

It is not advised to connect batteries of different models in series because the capacity is limited to the smallest battery in the string. It is also NOT recommended to connect other types of batteries formats such as lead acid batteries with lithium-ion batteries.

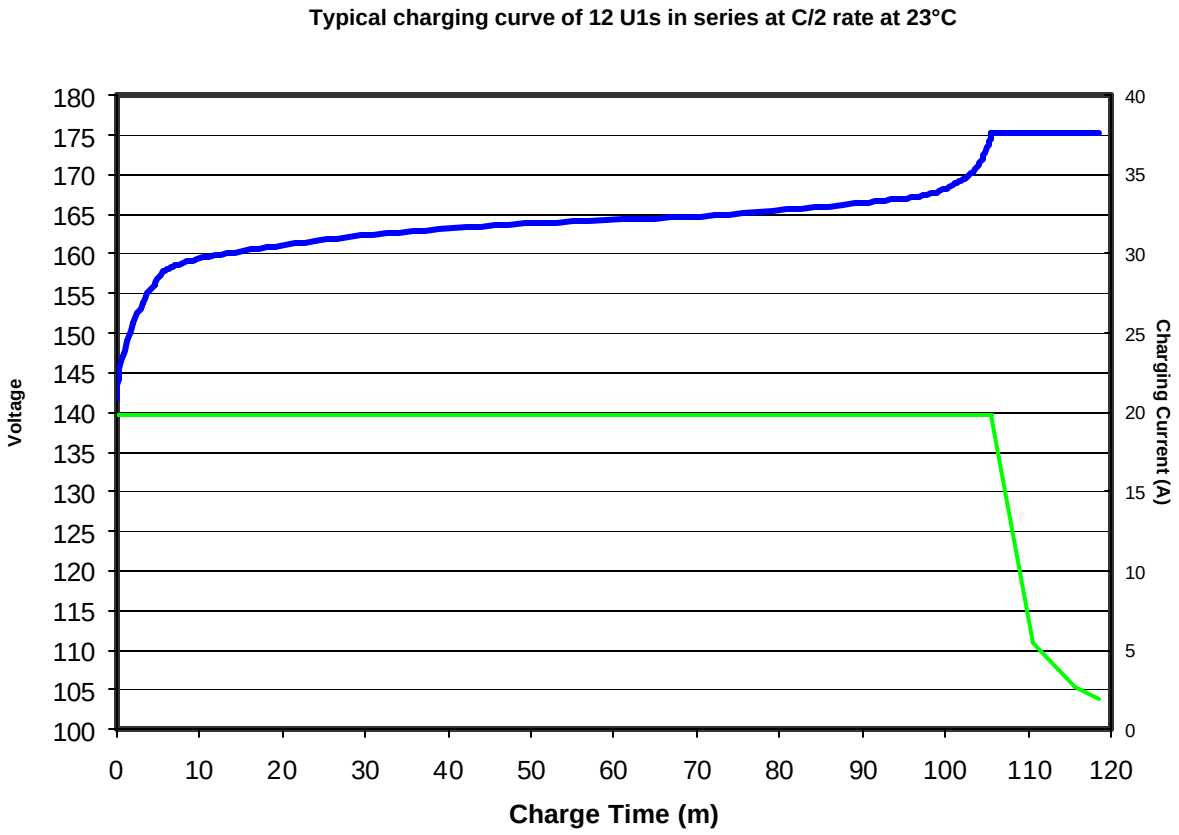


Figure 6.

Example for Charging 12 U-Charge® Batteries:

Charge to 175.2V = (14.6V x 12 batteries in series) and hold.

- When voltage reaches 175.2V, the battery is approximately 90% charged.
- Allow the current to naturally decay when voltage is reached.
- When the current drops below 2A for U1, 3A for UEV, 5A for U24, and 6A for U27, the battery is considered 100% charged.
- Float at 165.6V = (13.8V x 12 batteries in series) and hold.
- It will not hurt the battery if the voltage is continuously present, even after 100% SOC is reached.

If you have any questions, please call Valence Technology for the recommended charging profile for your system.

The U-Charge® XP power system includes electronics that monitor conditions of the battery pack.

The U-BMS must be installed such that it either shuts down the charger or opens the charge circuit, thus disabling charge.

7. U-CHARGE® XP POWER SYSTEM FEATURES

- Built-in electronic monitoring for state-of-charge, current, voltage and temperature
- Internal cell balancing
- LED battery status indicator
- Series connection up to 450 V maximum system voltage
- Rugged mechanical design – dust and water resistant to IP56 standards, flame retardant plastics
- Handles on U24, U27and UEV models
- Thousands of cycles, under normal conditions
- Maintenance-free
- Can be recharged using most standard lead-acid chargers (set for AGM/GEL cells) *verify with Valence Customer Support before charging.
- Communication of monitored data via optional U-BMS (accessed via RS-485 communication port)

Discharge and Charge Control

When the batteries are discharged to the point where any single cell block reaches its minimum value, 2.3V, the battery will communicate with the U-BMS to interrupt discharge. The U-BMS must be configured such that it either backs off current, shuts down the vehicle/device immediately, or opens a discharge circuit, thus disabling discharge. The battery also makes the same request during the charge if a cell goes higher than 4V.

When the U-Charge® XP power system has a GREEN LED status indication, it can be discharged in a normal fashion. If the LED is YELLOW, the battery is requesting to the U-BMS to back off current in order to reduce load or to reduce temperature. If any battery has a RED LED status indication, the battery is stating that it has experienced a very low or very high cell voltage. This should return to GREEN after a full cycle.

State Of Charge (SOC) Measurement

Individual cell voltage and charge/discharge current will be used to monitor the state-of-charge (SOC) of the battery. The estimated capacity used for the calculations will be adjusted to meet the capacity of the lowest capacity cell bank when the pack is fully cycled. The state-of-charge will be adjusted for normal self-discharge of the battery when the unit is not on charge.

Note: Lead acid state-of-charge meters should not be used with the Valence Technology U-Charge® power systems. They will not be accurate.

Cell Balancing

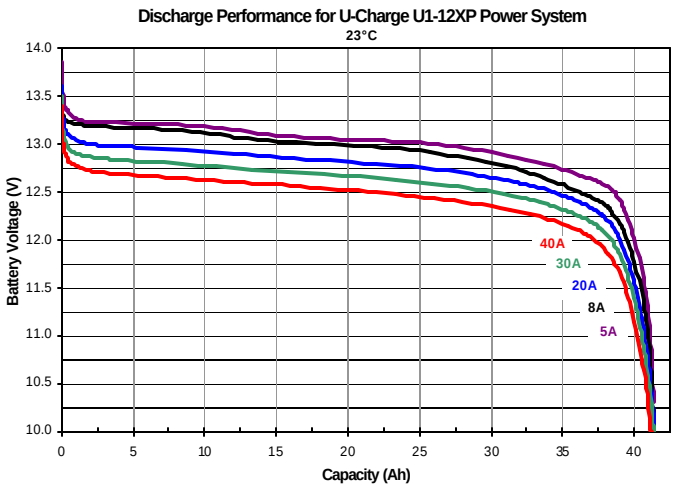
Battery cell variability and environmental conditions can cause slight state-of-charge imbalances between cells. Each module automatically balances each cell block during top of charge to minimize potential capacity differences. The battery automatically performs adjustments to the state-of charge algorithm after a full discharge and charge.

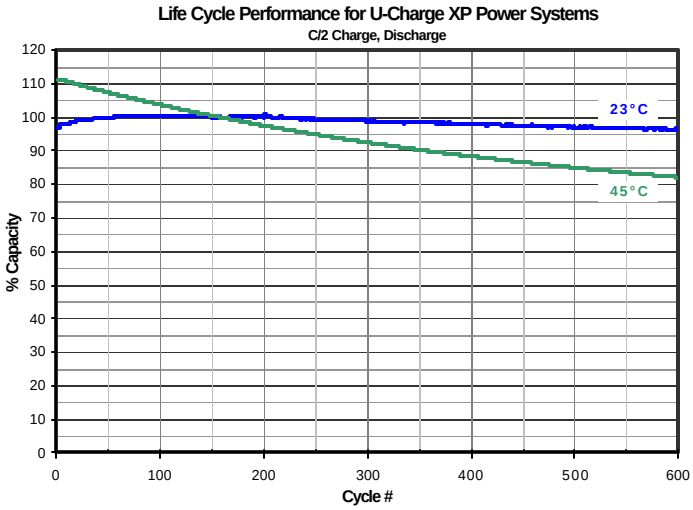
U-Charge® Battery Specifications

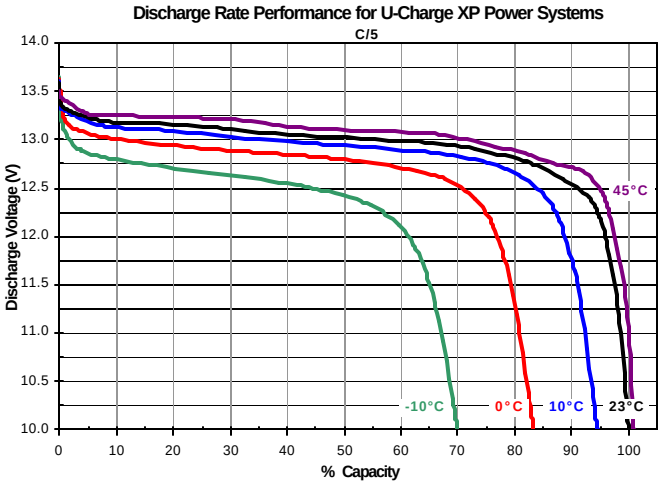
Specifications		U1-12XP	U24-12XP	U27-12XP	UEV-18XP
Voltage		12.8 V	12.8 V	12.8 V	19.2 V
Capacity (C/2)		40 Ah	100 Ah	130 Ah	65 Ah
Dimensions including terminals (L x W x H)		197x130x182 mm 7.75x5.2x7.2 in	260x173x225 mm 10.24x6.8x8.6 in	306x173x225 mm 12x6.8x8.6 in	268x148x269 mm 10.55x5.8x10.6 in
BCI Group Number		U1R	Group 24	Group 27	N/A
Weight		6.1 kg / 13.4 lbs	15.8 kg / 34.8 lbs	19.5 kg / 42.8 lbs	14.9 kg / 32.7 lbs
Terminals, female-threaded		1/4-20	M8 x 1.25	M8 x 1.25	M8 x 1.25
Specific energy		84 Wh/kg	81 Wh/kg	85 Wh/kg	84 Wh/kg
Energy density		110 Wh/l	126 Wh/l	140 Wh/l	117 Wh/l
Standard Discharge	Max. cont. current	80 A	150 A	150 A	150 A
	Max. 30 sec. pulse	120 A	300 A	300 A	200 A
	Cut-off voltage	10 V	10 V	10 V	15 V
Standard Charge	Charge voltage	14.6 V	14.6 V	14.6 V	21.9 V
	Float	13.8 V	13.8 V	13.8 V	20.7 V
	Max. cont. current	20 A	50 A	65 A	30 A
	Charge time	2.5 hrs	2.5 hrs	2.5 hrs	2.5 hrs
DC internal resistance (approx.)		15 mO	6 mO	5 mO	10 mO

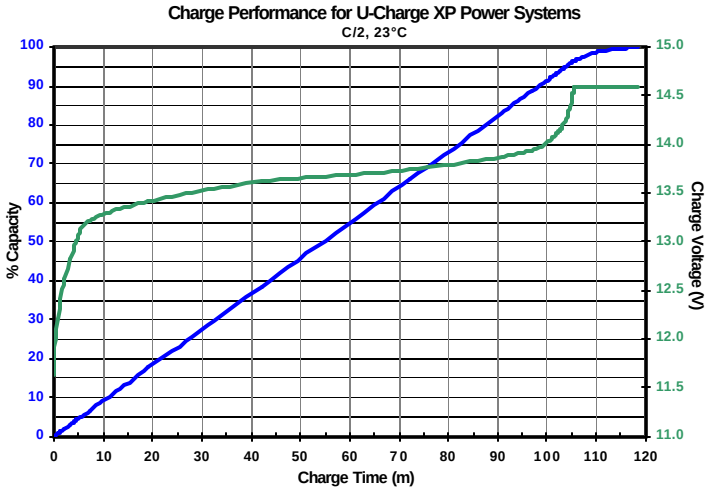
Common Specifications	U-Charge® XP power systems
Operating temperature	-10°C to 50°C (14°F to 122°F)
Storage temperature	-40°C to 50°C (-4°F to 122°F)
Operating humidity	5% to 95%, non-condensing
Water/dust resistance	IP56
Shock and vibration	IEC61960, DIN VG96 924
Certifications	FCC Class B, CE, UL1642 (cells)
Shipping classification	UN 3090, Class 9

Table 5: Battery Specifications









Companion Devices for U-Charge® XP power systems

U-BMS-HV and U-BMS-LV: Battery Management Systems that feature battery to battery balance control, direct control capability for up to four contactors, and CAN-Bus communications port to access monitored data. The HV model operates at 100V - 450V; the LV model operates at 10V - 150V. One U-BMS can manage up to 30 batteries simultaneously.

Please refer to separate datasheet on the U-BMS products.

8. BATTERY STATUS INDICATORS

GREEN LED: Normal Operation A green blinking LED indicator on the lid of the battery is used to indicate the working status. It will blink once every 20 seconds when in sleep mode, and once every 5 seconds when it is awake, active, and communicating with the U-BMS.

YELLOW LED: Temporary Fault Indication If the LED indicator blinks YELLOW, one of the following is occurring:

- Cell temperature is between 60 and 65 °C. Allow battery systems to cool.
- Cell voltage is between 2.3 and 2.5 volts. Reduce load on the battery.
- Internal electronics' temperature is between 85 and 100 °C.

RED LED: Fault Indication If the LED indicator blinks RED, one of the following has occurred:

- Cell temperature is > 65 °C
- Cell voltage is < 2.3V even after 1 minute of charging.
- Internal electronics' temperature is > 100 °C

No LED Indication: Fault Indication or Over Discharged If the LED indictor is not blinking, apply a charger and look for one of the following conditions:

Contact Valence Technology, Inc. for further information.

9. TIPS FOR OPTIMIZING PERFORMANCE

By following the tips listed below, one can assure long life and high performance of the U-Charge® XP power system:

- Charge all batteries fully prior to first use of the vehicle/device.
- Allow battery to charge fully over night periodically.
- Use at temperatures be low 40ºC.
- Charge battery fully prior to long storage periods.
- Charge battery fully if it has been stored for more than three (3) months.
- 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.
- Use recommended torque ratings for the bolts.
  -U1- Torque provided hardware to 110 in-lbs maximum (12.4 Nm). Retorque on occasion to 85 in-lbs (9.6 Nm)
  -U24, U27 and UEV- Torque provided hardware to 160 in-lbs maximum (18 Nm). Retorque on occasion to125 in-lbs (14.1 Nm).
- Proper thermal management will maximize life. This includes adequate air cooling.
- If a battery is replaced, all battery should be at the same state of charge when placed into the pack.

10. MAINTENANCE AND STORAGE

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 Valence Technology 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 any single battery's voltage is under 10V (15V for UEV) 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 be recharged.

Battery Storage

- Each battery, when disconnected from other batteries and the BMS, will automatically go into a sleep mode. The sleep function instructs the monitoring circuitry to shut down to maximize shelf life. In sleep mode, a 100% charged battery can be stored safely for up to a year without the need for recharge, however monthly tests are recommended. If the batteries are to be stored for longer than a year, please connect the batteries to a U-BMS and perform a maintenance charge.

- Test the open circuit voltage periodically and recharge if it is at or below 12V (18V for UEV). Monthly tests are recommended.
- Store in an open, well ventilated, dry, clean area, between -40°C and 45°C (-40°F and 113°F) for maximum life. Self discharge is accelerated at higher temperatures.
- Do not expose the battery to extremes of temperature over 60°C (140°F).
- Do not expose the battery directly to sources of heat.
- 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.

11. TRANSPORTATION AND SHIPPING

When transporting or moving the battery within your installation, please follow the guidelines below.

- Avoid heavy vibration during transportation.
- Avoid throwing, rolling and excessive stacking during loading and transportation.
- Make sure that all cables and external connectors are disconnected and removed from the battery prior to moving it.

If the product needs to be shipped to a different location or sent back to Valence Technology, Inc for any reason, please follow the guidelines below carefully.

1. Disconnect all cables, both power and communications from the batteries.
2. 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 (See Note below)
3. The package should be prepared for shipment and shipping documents should be signed by an individual who is certified to handle and prepare products that have been designated as "Dangerous Goods" for shipment.
4. Ship under regulations UN3090, Class 9- "Dangerous Goods".

Important Note: The U-Charge® XP power system 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.

12. BATTERY OVERHEATING

If the charger malfunctions or the system continues to overcharge the battery past 100% for a given amount of time AND the safety disconnect device fails or is not in place, the battery can be damaged beyond repair, and in some cases get extremely hot possibly releasing smoke and melting plastic.

Emergency Procedures for a Melting or Smoking Battery

If a battery begins to smoke or melt remove charging source immediately.

1. If possible move the battery to a well ventilated area, preferably outside.
2. Use a fire extinguisher, either carbon dioxide, dry chemical or appropriate foam to spray the hot battery. If a fire extinguisher is not available, use copious amounts of water, or cover the battery with sand.

Emergency and 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 is irritating to the eyes, mucous membranes and respiratory tract.
- Causes eye and skin irritation.
- Exposure can cause nausea, dizziness and 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 **not breathing or difficulty breathing:**

- Give artificial respiration.
- If breathing is difficult, give oxygen.

If **swallowed**

- Wash out mouth with water provided person is conscious.

In All Cases

- Call a physician

13. DISPOSAL OF BATTERIES

Customers should select an appropriate and responsible disposal method that satisfies state and local requirements when disposing of lithium-ion batteries. Commonly available methods include disposal and collection by a licensed waste company or recycling. Some states and communities have programs for collecting and/or recycling spent batteries. Valence Technology, Inc. cannot predict if current lithium-ion battery disposal requirements will change in the future that would require specially mandated handling and disposal techniques. If you have any questions regarding state or local disposal requirements, please contact your local environmental authority.

Batteries have residual electrical charge. Please be sure to completely discharge batteries before disposing them. For ideas on simple methods of discharging batteries, please contact Valence Technologies.

If you are not sure if your waste facility can handle lithium-ion batteries, contact them and verify if they are permitted or not.

Recycling

The Rechargeable Battery Recycling Corporation's web site, www.rbrc.org, is an excellent source for finding a facility to handle these types of batteries.

To encourage recycling of spent batteries, the Environmental Protection Agency (EPA) allows spent batteries that are shipped to a recycling facility, to be shipped as "universal wastes" instead of "dangerous goods." The shipping requirements for "universal wastes" are available at the EPA website at www.epa.gov.

14. USE IN LIFE SUPPORT APPLICATIONS

The U-Charge® XP power system **SHALL NOT** be used in, or in conjunction with, any Life Support Application without the express written consent of Valence Technology, Inc. Life Support Applications include, without limitation: (i) a device to be implanted in a human body; or (ii) a system or device, which supports or monitors a human life, such that its failure could cause serious injury or death.

15. LIMITED WARRANTY

U-Charge® XP Power System Limited Warranty

Valence Technology, Inc. ("Valence") warrants the U-Charge® XP power system and its components ("Product") as free from defects in materials or workmanship under normal use for a period ("Warranty Period") of two (2) year from the date of original retail purchase. This warranty applies to the original purchaser (the "Customer") only and is non-transferable.

During the Warranty Period, should the Product, in Valence's opinion, malfunction, Valence's sole liability shall be, at Valence's sole discretion and at no charge to the customer, to either repair or replace the malfunctioning products if returned within the Warranty Period, freight prepaid, to the place of purchase or call 888-Valence (within the USA) or (001) 512-527-2900 (outside USA) for return instructions.

Each returned Product must include:

- The customer's name, address, and phone number
- A written statement detailing the nature of the claimed defect
- A copy of the original sales receipt showing the date of purchase

Warranty is void if Valence determines the Product has been:

1. Serviced by anyone other than Valence;
2. Modified by improper installation of third-party products;
3. Damaged from accident, misuse, misapplication or abuse;
4. Damaged by improper transportation or packing when returned by the Customer to Valence;
5. Damage by unusual physical stress or interference, failure or fluctuation of electrical power, lightning, static electricity, fire, or other acts of God; or
6. Operated outside of the parameters of the Manual.

THIS WARRANTY IS MADE IN LIEU OF ALL OTHER WARRANTIES, WHETHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A SPECIFIC PURPOSE. THE REMEDY SET FORTH HEREIN SHALL BE SOLE, EXCLUSIVE REMEDY WITH RESPECT TO THE PRODUCT.

No person is authorized to make any other warranty or representation concerning the performance of the Product. Some jurisdictions do not allow exclusion of implied warranties, so the above exclusions may not apply to you. Any limited warranties that cannot be disclaimed are hereby limited to a term of one (1) year from the date of original retail purchase or, in the event relevant state law requires an implied warranty term exceeding one (1) year, for the briefest term allowable under relevant state law. Some states do not allow limitation on how long an implied warranty lasts, so the above limitation may not apply to you.

Under no circumstances will Valence be liable for any indirect, special, incidental, or consequential damages, including any loss of revenue, loss of profit, or loss of data whether based on warranty, contract, tort, or any other legal theory, even if Valence has been advised of the possibility of such damages. Valence shall not be liable for any claims made by any third party or made by the Customer directly or indirectly on behalf of any third party. Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or seclusion may not apply to you.

Valence reserves the right to change Product specifications or to discontinue the Product or other Valence products without prior notice.

This warranty supersedes all previous Valence product warranties.

VALENCE TECHNOLOGY SUPPORT

www.valence.com
Customer Service: 1-888-825-3623 (within USA)

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