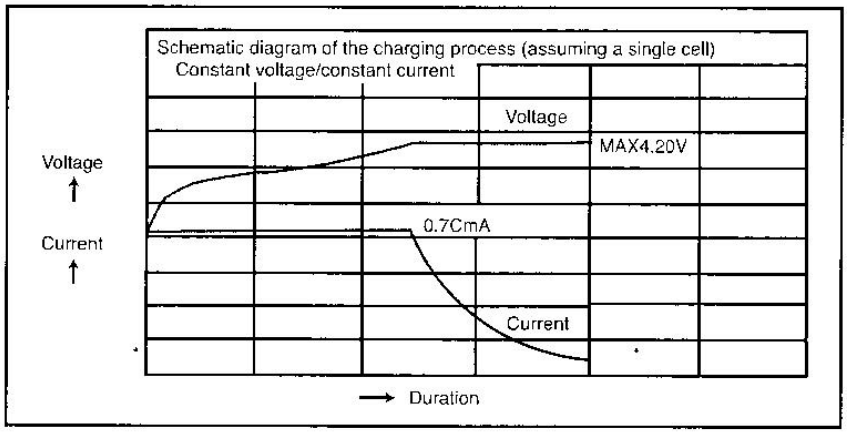
NOTES AND PRECAUSIONS

- **Safety Precautions for the Lithium ion Battery Pack**
  Use of Lithium Ion Batteries and the Design of Equipment That Uses These Batteries

In general, lithium ion batteries are used in battery packs that contain both lithium ion batteries and battery protection circuits. Both items are sealed in a container made of a material such as resin so that the battery pack cannot be easily disassembled.

0. Charging The Batteries
The "constant voltage/constant current" method is used to charge lithium ion batteries. (see Fig. below)



(1) Charge Voltage
The maximum voltage is 4.2 V x the number of cells connected in series.

(2) Charge Current
We recommend 0.7 CmA.
When the voltage per cell is 2.9V or less, charge using a charge current of 0.1mA or less.
(Contact Sealed Energy Systems for information regarding pulse charging)

(3) Charge Temperature
The batteries should be charged at temperature between 00C and 450C

(4) Reverse-polarity Charging
Verify the polarity of the batteries before charging to ensure that they are never charged with the polarity reversed.

0. Discharging the Batteries

(0) Discharge Current
The current should be maintained at 1.0 CmA or less (consult Sealed Energy Systems if you plan to discharge the batteries with a current in excess of 1.0CmA).

(0) Discharge Temperature
The batteries should be discharge at a temperature between –200C and +600C.
(Consult Sealed Energy Systems if you plan to discharge the batteries at temperatures less than -100C.)

3) Discharge Termination Voltage

Avoid discharging at voltages less than 3.0 V per cell. Overdischarge can damage the performance of the battery. Equip the unit with a mechanism to prevent over discharge, especially in situations where the user may forget to turn the equipment off.

0. Equipment Design

(0) Installing Battery Packs in the Equipment
To avoid damage to the battery pack, make sure that the battery pack is positioned away from heat sources in the equipment or in the battery charger.

(0) Mechanisms to Prevent Dropping
Be sure to use a battery pack lock mechanism to prevent the battery pack from being ejected when the equipment is dropped or receives a sudden impact.

(0) Preventing Short Circuits and Reserved Connections
Use a terminal structure that makes it unlikely that the terminals will be shorted by metallic necklace, clips, hairpins, etc. Structure the battery and the terminals to the battery in sub +a way that the battery pack cannot be put in backwards when installed in the charger or the equipment.

(0) Inclusion in other equipment
If the battery is built into other equipment, use caution to strictly avoid designing airtight battery compartments.

(0) Terminal Materials in the External Equipment
Use materials that are highly resistant to corrosion (such as nickel or nickel – coated copper). If contact resistance is an issue, we recommend that you use contact plating (such as gold plating) on the terminals.

0. Storing the Batteries
The batteries should be stored at room temperature, charged to about 30 to 50% of capacity.
We recommend that batteries be charged about once per year to prevent over discharge.

0. Use of the Batteries
See the section on “Safety Precautions for the Lithium Ion Battery Pack.”

0. Other

The Chemical Reaction
Because batteries utilize a chemical reaction, battery performance will deteriorate over time even if stored for long period of time without being used. In addition, if the various usage conditions such as charge, discharge, ambient temperature, etc. are not maintained within the specified ranges the life expectancy of the battery may be shortened or the device in which the battery is used may be damaged by electrolyte leakage. If the batteries cannot maintain a charge for long periods of time, even when they are charged correctly, this may indicate it is time to change the battery.

0. Please Note

The performance and life expectancy of batteries depends heavily on how the batteries are used. In order to ensure safety, be sure to consult with SES in advance regarding battery charging and discharging specifications and equipment structures when designing equipment that includes these batteries.

Please Note :

Sealed Energy Systems assumes no liability for problems that occur when the Notes and Precaution for use listed above are not followed.

SAFETY PRECAUTIONS FOR LITHIUM ION BATTERY PACKS

- **Safety Warnings**

1. When Using The Battery

⚠ WARNING

(1) Misusing the battery may cause the battery to get hot, rapture, or ignite and cause serious injury Be sure to follow the safety rules listed below:

- Do not place the battery in fire or heat the battery.
- Do not install the battery backwards so that the polarity is reversed.
- Do not connect the positive terminals and the negative terminal of the battery to each other with any metal object (such as wire).
- Do not carry or store the batteries together with necklaces, hairpins, or other metal objects.
- Do not solder directly onto the battery.
- Do not exposes the battery to water or salt water, or allow the battery to get wet.

(1) Do not disassemble or modify the battery. The battery contains safety and protection devices which, if damaged, may cause the battery to generate heat, rupture or ignite.

(2) Do not place the battery on or near fires, stoves, or other high-temperature locations. Do not place the battery in direct sunshine, o use or store the battery inside cars in hot weather. Doing so may cause the battery to generate heat, rupture, or ignite. Using the battery in this manner may also result in a loss of performance and a shortened life expectancy.

⚠ WARNING

(1) If the device is to be used by small children, the caregiver should explain the contents of the user manual to the children. The caregiver should provide adequate supervision to ensure that the device is being used as explained in the user's manual.

(2) When the battery is worn out, insulate the terminals with adhesive tape or similar materials before disposal.

(3) Immediately discontinue use of the battery if , while using, charging, or storing the battery, the battery emits an unusual smell, feels hot, changes colour, changes shape, or appears abnormal in any other way. Contact your sales location or SES if any of these problems are observed.

(3) Do not place the batteries in microwave oven, high-pressure containers, or on induction cookware.

(4) In the event that the battery is leak and the fluid gets into one eye, do not rub the eyes. Rinse well with water and immediately seek medical care. If left untreated the battery fluid could cause damage to the eye.

1. While Charging

⚠ WARNING

(1) Be sure to follow the rules listed below while charging the battery. Failure to do so may cause the batteries to become hot, rupture, or ignite and cause serious injury.

- When charging the battery, either use a specified a battery charger or otherwise ensure that the battery charging conditions specifies by SES are met.
- Do not attach the batteries to a power supply plug or directly to a car cigarette lighter.

- Do not place the batteries in or near fire, or into direct sunlight. When the battery becomes hot, the built in safety equipment is activated, preventing the battery from charging further, and heating the battery can destroy the safety equipments and can cause additional heating, breaking, or ignition of the battery.

(2) Do not continue charging the battery if it does not recharge within the specified charging time. Doing so may cause the battery to become hot, rapture, or ignite.

⚠ CAUTION

The temperature range over which the battery can be charged $0^{O}C$ to $45^{O}C$ .Charging the battery at temperature outside of this range may cause the battery to become hot or to break. Charging the battery outside of this temperature range may also harm the performance of the battery or reduce the battery life expectancy.

3. When Discharging the battery

⚠ WARNING

Do not Discharge the battery using any device except for the specified device. When the battery is used in devices aside from the specified device it may damage the performance of the battery or reduce its life expectancy, and if the devices causes an abnormal current to flow , its may cause the battery to become hot, rupture, or ignite and cause serious injury.

⚠ CAUTION

The temperature range over which the battery can be discharged is $20^{O}C$ to $60^{O}C$. Use of the battery outside of these temperature range may damage the performance of the battery or may reduce its life expectancy .

To ensure the safe use of this battery contact Sealed Energy Systems, when designing a device that uses this battery.