Battery Template

This template contains information necessary to control not only the hazard at the launch site, but also the hazard during launch phase of the launch vehicle.

Cell specifications

|  |  |
| --- | --- |
| Cell name/Manufacturer |  |
| Battery type (e.g. Li-Ion, Ni-MH) |  |
| Rated voltage (V) |  |
| Capacity (mAh) |  |
| Type of protective circuits, etc. (e.g. breakers, PTCs, etc.) |  |
| UN or UL certificate document No. |  |

Battery pack (assembly) specifications

|  |  |
| --- | --- |
| Configuration (e.g. 1S2P) |  |
| Total capacity of batteries (Wh) |  |
| Results of the assessment of the severity of hazard\* |  |

\*A rupture of a lithium-ion battery of 100 Wh or less as a battery assembly is not considered a catastrophic or critical hazard outside of an explosive hazardous atmosphere, but a rupture in an explosive hazardous atmosphere is considered a catastrophic hazard. A rupture of a Ni-MH battery is not considered a catastrophic or critical hazard due to its low energy density.

For a catastrophic or critical hazard, the following verifications are attached.

1. Verification of internal short of a cell

1.1. Control of cell/battery procurement

Describe UN or UL certificate document No. in the cell specifications. (In the case of cells certified by a space agency, describe the agency name.) (1-1-1)

1.2. Elimination of cells that cause internal short in the launch environment

To eliminate cells that may cause internal short in the launch environment, describe that there in no change in battery charge/discharge characteristics before and after environmental tests (vacuum test, vibration test, etc.) in the on-board condition or battery assembly.

Figure. Battery charge/discharge characteristics measurement results before and after environmental testing (1-1-2)

2. Verification of external short of the cell (select one of 2.1. or 2.2.)

2.1. Preparing two protection functions (separator shutdown function, PTC etc.) against short-circuit outside the cell. The part where short-circuit as assumed in the path between the cell and the external protection function is double-insulate. (Because external protection function doesn’t work in the short-circuit of this path.)

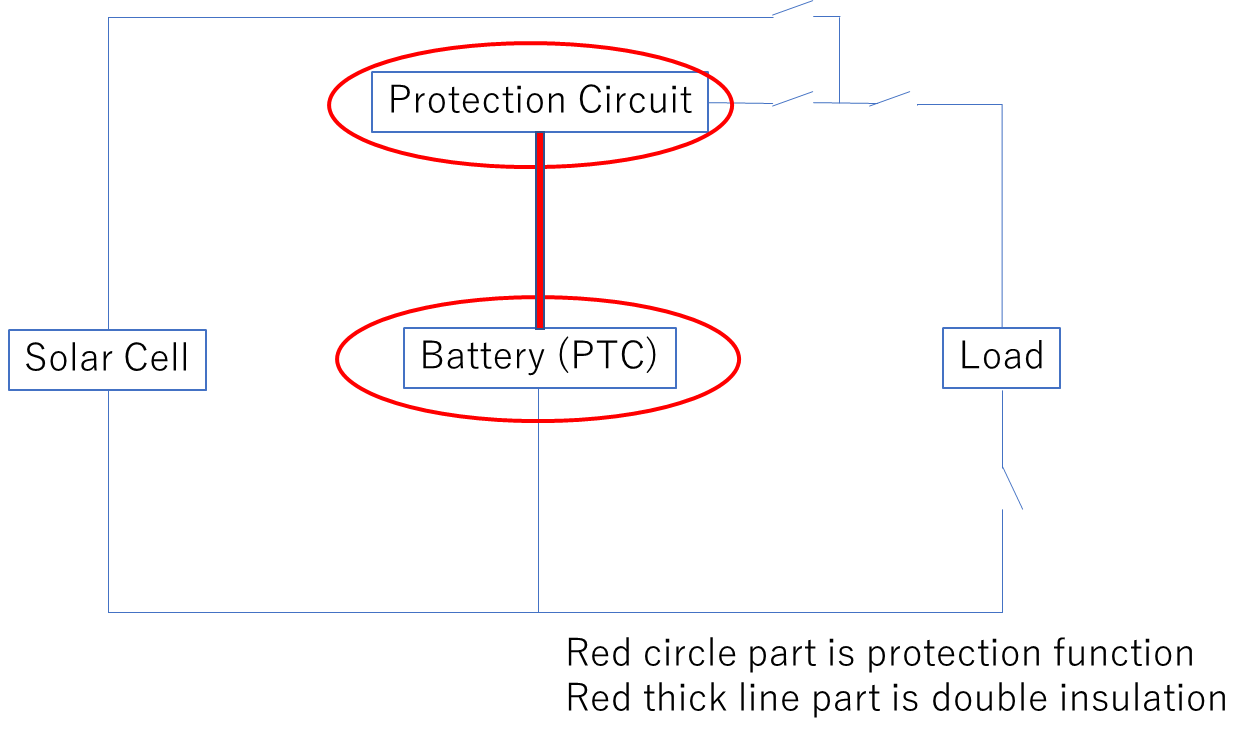


Figure. Outline of the protection function and double insulation (2-1-1)

2.2. Double insulate the load side (generally up to the switch nearest the battery)

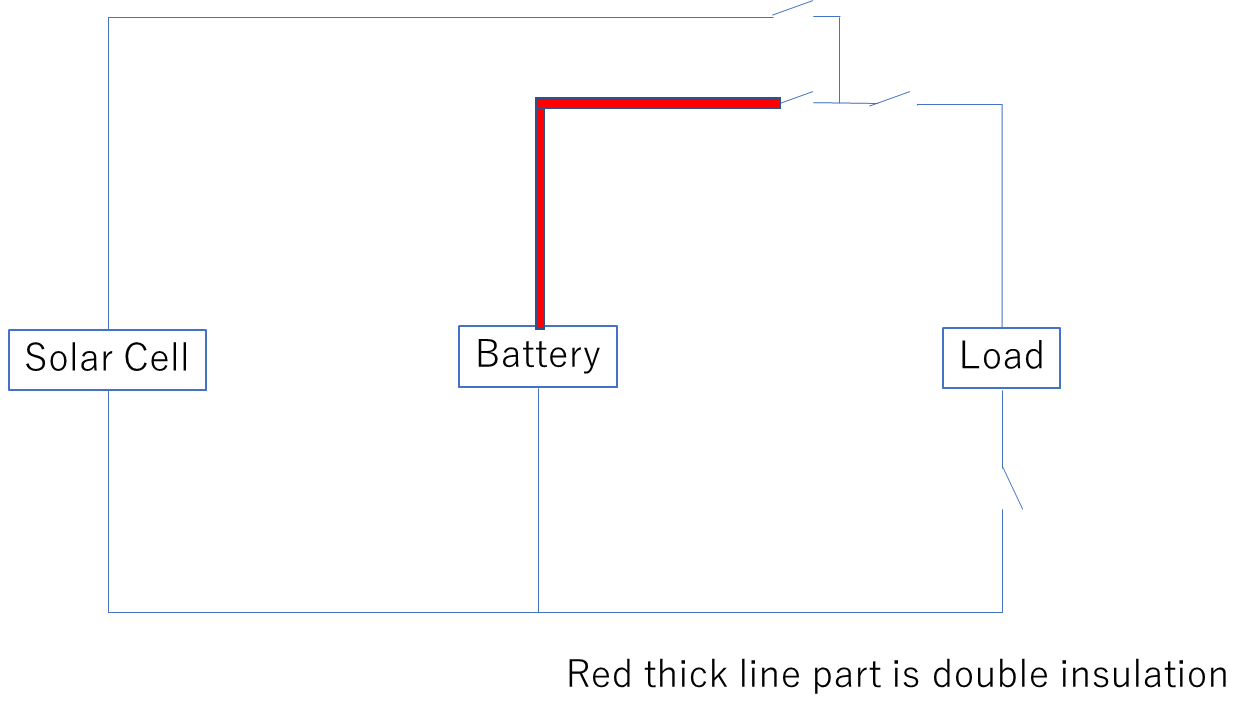


Figure. Outline of double insulation (2-2-1)

3. Verification against overcharging when charging at the launch site.

Payload



Battery Unit

Component A

Component C

Solar Array Simulator

EGSE

Component B

Monitor line 1 (Battery voltage)

Monitor line 2 (Cell voltage)

Monitor line 3 (Battery voltage)

ON

OFF

Figure. Overcharge prevention function (3-1-1)