RoboCupJunior Japan Open 2017 Gifu/Nakatsugawa

Handling of Lithium-based Rechargeable Batteries

Batteries and Robots

Every lithium-based rechargeable battery (all lithium materials such as lithium ion) has to meet requirements as follows:

1. Each battery must be labeled stating the manufacturer's product name, voltage, and so on. Additionally, participants must bring one of a product manual, specification or warranty card along with the battery.

   Only batteries which are clearly stated the location of responsibility will be allowed to use at the venue.

2. Participants are never allowed to use a battery cell and self-made or remodeled battery. Also, don't use batteries with large scratches or deformed.

   Handling of lithium-based rechargeable batteries is very delicate. Wounded or deformed battery may have some trouble inside. Be sure to check this not only at the inspection but also before starting the game or before charging.

3. The Capacitance of the lithium-based rechargeable battery is 45Wh or less (23Wh or less for Soccer LightWeight league). Also, parallel/serial use of rechargeable batteries is prohibited.

   Other leagues for the soccer have no regulation on the capacitance, though, it is encouraged to keep less than 45Wh as the common standard for all league. Also, It 's hard to keep a balance between cells of lithium-based rechargeable batteries, so it is prohibited to connect plural batteries in parallel or in series.

4. Every robot and a lithium-based rechargeable battery should have the overcurrent/over-discharging protection. Or the team needs to have an own procedure for safety use of the battery. Team members are required to explain about its measures of safety by showing the outline with diagrams.
   - If the rechargeable battery has an internal protection circuit, please describe it's detailed. If not, participants have to add the overcurrent, over-discharging, and overheat protection externally. Same as this, if a team cannot describe the operation of the built-in protection, the team must add protection circuits on the outside.
   - Each robot putting lithium-based rechargeable batteries needs to install an overcurrent protection circuit or a fuse of 20A or less in the vicinity of the rechargeable battery as a short circuit.

5. The rechargeable battery mounted on the robot must be fixed and protected so that it will not be damaged during the game.

Charger

The charger used at the venue needs to satisfy the following criteria.

6. The charger must be a PSE certified product[*].
   Chargers without authentication are not allowed using at the venue. DC type charger is not allowed because it has no authentication.

7. The charger has to be satisfied the specification for charging batteries that team uses. Teams are encouraged to use a charger which is designated from or recommended by a rechargeable battery manufacturer. A team should bring a document for clarification to the venue.

8. If the charger is not designated from or recommended by a manufacturer, the charge rate is limited up to 1C or less.

9. Teams can charge within the paddock during the event. While charging, the team has to display a sign of 'Charging' so that the other participants can recognize it, and at least one member of the team needs to monitor charging for not missing a dangerous sign.

Batteries and chargers that do not conform to the above criteria cannot be brought into the venue. There will be held a special battery inspection separately from regular robot inspection. Please bring the necessary documents to the venue and get the battery inspection.

Teams need to submit a set of "The Lithium rechargeable battery usage application form" for each robot that uses a lithium-based rechargeable battery. If a team uses plural kinds of lithium-based rechargeable batteries for one robot, please prepare a describe document for each battery.

*Attention:

Dear a team mentor and the father/mother/guardian of each team member,

Please confirm every description of a battery and the protection circuit or a procedure for safety usage. If you could agree with team's description in the documents, please sign your signature on the application form. We need a set of the application form before the competition day for grasping a number of the team that uses lithium-based chargeable batteries in advance. It would help us if you could send a copy of these documents via email (mailto:gifu.nakatsugawa.battery@gmail.com) as soon as possible, before your departure to Japan at the latest.

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[*] Further information about PSE and the Electrical Appliance and Material Safety Law, please refer a link as follow:
http://www.meti.go.jp/english/policy/economy/consumer/pse/index.html

The Lithium rechargeable battery usage application form

For RoboCupJunior Japan Open 2017 Gifu/Nakatsugawa

Region	
League	
Team name	

Each participant agrees to comply the items described in the Handling of Lithium-based Rechargeable Batteries and to use lithium-based rechargeable batteries with sufficient safety consideration. If an accident occurred because of the team's fault, every team members and relations should express an apology and pay for the damage with responsibility.
Signature here to indicate you have read and understood the above:

DATE: _____

(Member 1)

SIGNATURE OF MEMBER: _____

SIGNATURE OF PARENT OR GUARDIAN: _____

(Member 2)

SIGNATURE OF MEMBER: _____

SIGNATURE OF PARENT OR GUARDIAN: _____

(Member 3)

SIGNATURE OF MEMBER: _____

SIGNATURE OF PARENT OR GUARDIAN: _____

(Member 4)

SIGNATURE OF MEMBER: _____

SIGNATURE OF PARENT OR GUARDIAN: _____

(Member 5)

SIGNATURE OF MEMBER: _____

SIGNATURE OF PARENT OR GUARDIAN: _____

(Member 6)

SIGNATURE OF MEMBER: _____

SIGNATURE OF PARENT OR GUARDIAN: _____

Check List

#	Items
1	Please fill in the specifications of the rechargeable battery. **Product name (manufacturer):** ☐ The battery is labeled stating the manufacturer's product name, voltage, and so on. ☐ There is a product manual, specification or warranty card.
2	☐ The battery is not a battery cell, self-made or remodeled battery. ☐ There is no large scratches or deformed on the battery.
3	☐ The total electric capacity of the battery is 45Wh or less (23Wh or less for Soccer LightWeight league). (Voltage) **V** * (Current) **mAh** = (Capacitance) **Wh** **C**
4	☐ The battery has an overcurrent/over-discharging protection. Or the team has an own procedure for safety use of the battery. ☐ Team members can explain about its measures of safety by showing the outline with diagrams.
5	☐ The battery is mounted robustly and protected so that it will not be damaged easily. ☐ Team members can explain it.
6	Please fill in the specifications of the charger. **Product name (manufacturer):** **Charging Current:** **A** ☐ There is a PSE mark on the charger.
7	☐ There is a document for clarification which shows the charger meet the requirement for charging batteries that team uses.
8	☐ If the charger is not designated from or recommended by a manufacturer, the charge rate is limited up to 1C or less.

I have heard an explanation from team members and confirmed all items listed in above list.

SIGNATURE OF MENTOR: _____

DATE: _____

The Overcurrent/Over-discharging Protection

Please draw or paste a diagram of overcurrent/over-discharging protection of the battery, or explain an own procedure for safety use of the battery. (Please use additional papers if you need.)

- The current value in which overcurrent protection works:

(Current) **mAh** * **C** = **A** >= (Current values for protection) **A**

- The voltage value in which over-discharge protection works: **V**