

454g Battle Robot Design Code

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Chapter 1 Basics of Battle Robots

Section 1 Mobility

A robot that walks, rolls, runs, slips, or does not damage the stadium in any way.

You must be able to move within the law.

SECTION 2 Robot Control

All functions and position movements of the robot must be made with reliable radio control. automation

Function is allowed but must be able to remotely disable or switch to remote control at any time.

All.

Section 3 robot form

The robot can be composed of two or more 'multibots'. Each robot must meet the requirements of this Code

In the case of weapons, only one robot needs to be attached. In addition, the weight of the entire robot goes beyond the weight limit

Should not be written.

Section 4 Component Protection

Batteries, high pressure tanks, fuel tanks and fuel lines must be sufficiently protected. Outer shell

Protruding batteries, high pressure tanks, fuel tanks, fuel lines, wires, etc. are not allowed.

Section 5 ground appeal

There is no specific provision for ground clearance. However, the stadium floor is not completely flat and the panel connections

May be uneven Also, obstacles protruding from the floor may be installed.

Consideration is necessary.

Chapter 2 Weight Limit

Section 1 maximum weight

The maximum allowable weight is 454g when ready to compete. There is no minimum weight limit.

All robot weights are measured on a certified scale prior to the race, and weights measured in other ways will not be accepted.

Do not. Keep in mind that the balance can have an error of about 1%, if the robot weighs in seconds

If overweight, the time to fix it before the game is very tight, so make it as low as possible.

It is recommended to add weight. When measuring weight, allowance of 10% is allowed as in the past competition

If you exceed the rule of 454g, you will not be allowed to participate unless it is modified before the match.

2. Weight Limitation of Walking Robots

- The walking robot gains a certain percentage of additional weight according to the following classification.
- A walking robot must not have a structure that rotates continuously in contact with the ground.
- Shuffler: Additional weight 50% (Gross weight: 681g)
 - ◆ Structure supporting robot by rotating cam or crankshaft through **continuous rotation** of drive motor

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A robot that moves by creating a reciprocating motion (corresponding to a robot foot or leg).

- ◆ Theo Jansen mechanism is also included in the shufflebot as it operates in a continuous rotation of the crank.
- Walker: additional weight 100% (total weight: 908g)
 - ◆ Control of multiple linear actuators or rotary actuators with **limited operating angles**
It means robot moving with.
 - ◆ The worker robot must use at least four degrees of freedom to move.

Section 3 Weight Measurement Exceptions

- The protective cover of the weapon is not included in the weighing. (Remove before game start)
- If the participant or organizer attaches a small camera to the robot, the camera weight is included in the measurement.
It doesn't work.

Chapter 3 Starting and Stopping the Robot

If the robot is not easy and safe to start and stop, the race may not be accepted.

Safety-related parts must comply with the regulations and apply as a first criterion when inspecting robots.

Start and stop must be performed by one operator and must be performed within the time specified in this regulation.

Should be possible.

Even if the robot's start and stop function satisfies this regulation, the final decision shall be made by the organizer.

Section 1 master switch

The position and accessibility of the master switch are the first considerations when designing the robot.

- The **“master switch”** must be able to mechanically cut off the power of the drive system and weapons.

It is safe to use two or more master switches if you can control the driving and weapon drives separately.

Do.

The requirements of the master switch are as follows.

- The operation should be simple enough for management.
- When special tools are needed for the switch operation, spares must be prepared.
- Switches that do not disconnect the main power supply are not allowed. (ex: on / off switch of motor driver , On / off switch for receiver power supply)
- Pluggable power interruptions using additional connectors in addition to mechanical switches are also permitted.

All switches must be operable within the start / stop time limit.

Section 2 start up

It should not take more than 30 seconds to start the robot. This is the case when the safety cover is removed and the master switch is operated.

Contains the liver. In the case of multibots (multiple robots within the weight limit), all robots are activated within 30 seconds

You should be able to.

When the master switch is turned on, the robot's drive or weapons must not move without any movement.
do.

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Section 3 suspension

When the robot is stopped, the robot must not move in any way. If the stop operation exceeds 30 seconds,
Can not be done. If the robot is severely damaged during the grounding, the stop time rule may be ignored but
A safe state (full stop) must be taken before withdrawing from the intestine.

Chapter 4 Electrical System

Section 1 voltage limit

The maximum allowable voltage is 220V, but when using more than 48V, please check with the organizer about the stability of the electric syst
It must be able to be ordered and the organizer has the right to refuse to participate in the race, depending on safety.

Section 2 battery

The type of battery is not limited. If lead acid battery is used, AGM type must be used.
If the battery catches fire during a match, the organizer reserves the right to turn off the lights and remove all smoke.
The millet can be closed, so the battery must be protected.

Chapter 5 Remote Control

All communication with the robot uses MIC-certified frequency of 2.4GHz band and the receiver and operator
A remote controller capable of connecting via copper pairing shall be used.
In addition, when the remote control system is powered off, all the robots should stop. If oh
Eligibility may be lost if operation or confusion with other systems occurs.

Chapter 6 Materials of Robot

Basically, the organizer does not want to remove huge debris or poison after the game.

Section 1 prohibition material

The list below is not an exhaustive list and requires appropriate judgment and

If you are unsure about this, you should contact the organizer before proceeding.

- Radioactive material
- Fiber materials that are harmful to the human body (asbestos, etc.). Carbon or glass fibers are possible.
- Excludes toxic or chemically reacting metals (such as cadmium, mercury, lithium) and metals inside the battery.
- Organics (excluding wood products and electrolytes in batteries).

SECTION 2 Exterior Material of Robot

Materials attached to the outside of the robot must not damage the field. The prohibited materials below are also comprehensive. It is not a list, so proceed with appropriate judgment.

- Lead
- Hard foamed plastics (polystyrene, foam urethane, etc.)

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- Glass or hard ceramic

Chapter 7 Flames

Robots are not allowed to use flamethrowers in class 454g.

Chief Operating Weapon

Every robot (at least one multibot) must be equipped with the right weapon. If nothing

If a flag cannot be used to damage an enemy robot or is determined to be a simple rule evasion that appears helpless,

Robots may be disqualified from participating.

1. Definition of Weapons

The weapon is a part of power that is separate from the driving part (wheel or other part) for movement .

Should be able to servant. Weapons can be used for robot movement (ex: the gyroscope effect

Robot movement) The basic functions of a weapon should not depend on the mobility of the robot.

Body rotating robot, etc.)

Wedge or assault robots are allowed, but must be equipped with a separate effective working weapon.

2. Launching Weapon

Firing weapons are allowed only if they do not damage the playing field. Launched weapons are never explosive

Do not use the vagina. Springs, catapults, or pneumatic guns are allowed. However, before the game, the launch weapon

It should be verified that it does not damage the polycarbonate protective walls of the stadium.

3. Multiple Weapons

Robots can equip one or more weapons, but they show destructive power against at least one weapon.

Should give.

Replacement (modular) weapons are recommended but no overweight will be permitted as a result of weapon replacement.

4. Rotary Weapons

Fail-Safe must be used when using rotating weapons. Fail-Safe shuts off the remote controller

If possible, the supply of power to the rotor should be cut off.

Rotating weapons may be used for full-speed rotation when commanded to stop by radio control or when the control signal is blocked.

It must be able to fully stop within 60 seconds.

Section 5 Prohibited Weapons

Weapons in the following manner are not allowed in any case.

- Items to entangle the robot's moving parts such as glue, net, fishing line, and beads
- Injection of liquids or liquefied gases (such as liquefied nitrogen)
- Weapons that damage the opponent's electronic system with an EMP generator or similar

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- Smoke Generator
- Bright light or laser that can damage your eyes
- Weapons that attack while destroying themselves
- Electric shock (ex: taser, tesla coil, high voltage shocker, etc.)
- Weapons that can cause fire, such as flames or iron

Chapter Internal Combustion Engine

The use of internal combustion engines is not permitted in this competition.

Chapter 10 Pneumatics

Pneumatics can be dangerous. Use other weapons if you do not have enough knowledge about pneumatics

Recommend.

The requirements for the pneumatic system are as follows.

- Pneumatic systems use only nitrogen (N₂) or compressed air, compressed gas for airsoft guns (commercially available) and CO₂ can be used.
- The maximum allowable pressure for storage is 3000 psi.
- The maximum pressure after decompression for pneumatic instrument operation is 400 psi.
- There are no restrictions on system design, but all components in the system configuration are verified for proper allowable pressure ratings. Parts must be used.
- Compression of air in storage tanks by means of an air compressor is also permitted, in which case the compression may begin if it is located in the playing field even if it is not started.
- Safety measures, such as stopping the pneumatic system or releasing air, must be included in the robot's stopping method.

If you have sufficient experience and knowledge of the safety of the pneumatic system and can understand it, Power restrictions can be relaxed.

Chapter 11 Hydraulics

The requirements of the hydraulic system are as follows:

- The maximum system pressure is 3000 psi. Sufficient experience and knowledge about the safety of hydraulic systems And pressure constraints can be relaxed if they can be understood.
- The hydraulic fluid must be inert, non-corrosive and designated for low toxicity and high pressure do.
- There are no particular restrictions on the system configuration, but the parts used must be suitable for the working pressure. do.
- The hydraulic oil storage tank must be protected from impact.
- A decompression method must be in place to stop the robot arm.

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Chapter 12 Operational Safety

The sharp surfaces and corners of the robot must have a removable protective device that can be securely fixed. The protector It must be mechanically fastened and free of external friction, shock or deviations from its own weight.

If a weapon or other part can move and cause injury while the robot is in stop mode,

Above, a mechanical locking device to prevent movement should be attached.

If the robot's cover or lock is deemed inappropriate, the organizer will prevent the robot from moving.

I have a right.

Chapter 13. Magnets

The use of magnets, which is applied to the stability of the robot or to catch an opponent robot, is permitted.

Don't. (Without magnet inside the motor)

Chapter 14 Appearance

For inappropriate phrases or pictures on the outside of the robot, use of inappropriate words when selecting a robot name, etc.

The organizer reserves the right to refuse modification or participation. Sponsor Marks are allowed.

★ This regulation will continue to be revised. To the changed version number after modification
<http://www.seoultechrobot.com/>, <http://cafe.naver.com/letsmake> Notice is made through. Oh yeah

Gaza is obliged to know these regulations and to keep an eye on the new version.

You have the right to refuse to participate in any competition for robots that do not comply with the rules. In case of uncertainty in regulations

At the discretion of the management, it will be reflected in future regulations.