

Sumobot

Name of Event:	Sumobot
Robots per Team:	1
No. of Players:	1 player/team
Robot Control:	Please refer below
Event Summary:	Two robots compete in a head-to-head match following the basic system of traditional human sumo matches. Robots are to be fully autonomous and self-powered. Weapons of any sort that pose a potential danger to robots and humans are strictly not allowed. - Adopted from FSI All Japan Robot Sumo

Objective

Participants are required to build an autonomous, self-contained mobile robot that is able to push its opponent out of the specified ring according to the tournament rules.

Robot

2.1. Robot Dimension and Specifications

2.1.1. A robot must fit within a square tube of the appropriate dimensions for the given class. The size of the robots depends on the weight categories.

Class	Control	Width	Length
1Kg / 3Kg (Wheeled)	Autonomous	20 cm	20 cm
1Kg / 3Kg (Wheeled)	Wireless RC	20 cm	20 cm
1 Kg (Legged)	Wireless RC	25 cm	25 cm
5 Kg (Wheeled)	Wireless RC	25 cm	25 cm
Basic (Wheeled)	Autonomous	INEX ATX2 SUMO Kit ONLY See Figure 3	

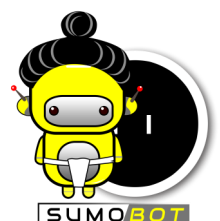
2.1.2. There is no height restriction. Robots are allowed to expand after 5 seconds from the start of a round.

2.2. Robot Restrictions

2.2.1. The robot is required to use any INEX microcontroller.

2.2.2. For the BASIC class:

2.2.2.a. All sumo robot parts must be taken from the standard INEX ATX2 Sumo Robot kit only. Standard kit has 1 distance sensor, and 2 reflector (line follower) sensors.



2.2.2.b. Participants are allowed to use only 6xAA batteries.

2.2.2.c. Modification to any part in the kit is STRICTLY NOT ALLOWED.

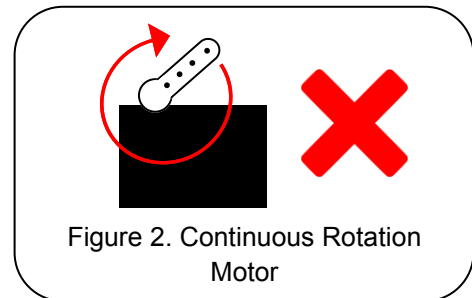
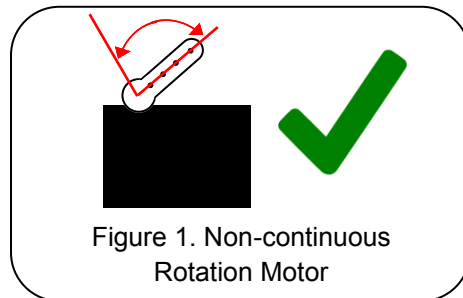
2.2.3. For the Legged class:

2.2.3.a. At least 2 legs are required for the robot.

2.2.3.b. All robots' legs need to mimic the articulation of the natural legs.

2.2.3.c. Continuous rotation method of propulsion of any kind is strictly NOT allowed.

2.2.3.d. There is no limit on the number of actuators used in the robot.



2.2.4. The robot must not have a device that interferes with the sensor operation of its opponent. e.g. Jammer, strobe light, laser & etc.

2.2.5. Robot's shovel or lifting mechanism of any sort that comes into contact with the opponent must be dull black in color.

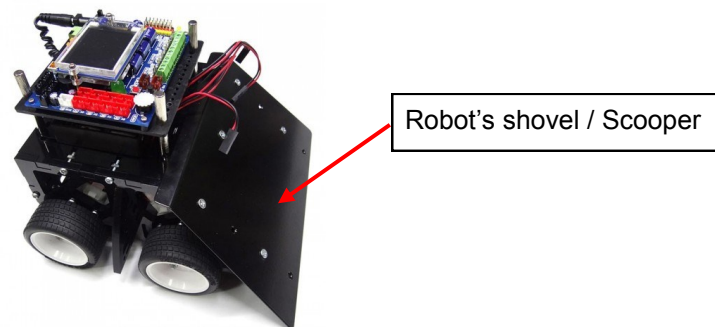


Figure 3. INEX ATX2 Sumo Robot

2.2.6. Reflective materials to disrupt IR distance sensors or IR line tracing sensors are not allowed.

2.2.7. Robots shall NOT cause any danger or damage to the arena & surroundings in anyway whatsoever.

2.2.8. Robots shall not throw liquid or powder or other substances at the opponent.

2.2.9. Robots shall not employ any flammable devices as a weapon.

2.2.10. Robots shall NOT use any form of compress air system or magnets.

For extreme and All Japan Sumo, magnets are allowed.

2.2.11. Robots shall NOT secure itself on the ring surface by using, suction cups, diaphragms, sticky threads, glue or other such devices.

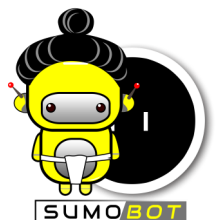
2.2.12. Robots shall not use projectile weapons or saw-blades.

For extreme and All Japan Sumo, blades are allowed.

2.2.13. Robots shall protect their sensors from any outside interferences.

2.2.14. The robots in the **1kg Autonomous**, **1kg RC**, and **3kg RC** categories should have a built-in motor driver on the board. External motor drivers are NOT allowed.

2.2.15. It's the REFEREE'S sole discretion to disqualify a robot if it is deemed dangerous for this competition.



3.1. Playing Field

3.1.1. The Sumo Ring is made up of a circular wooden plank. The surface of the Sumo Ring is smooth and NOT rubberized.

For extreme and All Japan Sumo, a steel sumo ring will be used.

3.1.2. The surface of the ring is painted black (inner ring) and white (border).

3.1.3. The thickness of the ring must be at least 2cm thick.

3.1.4. Shikiri lines consist of two painted parallel brown lines. It will be placed at the center of the ring. For your reference, see tables and figures below.

Table 2. Sumo Ring Dimension					
Class	Ring Diameter	Border Width	Shikiri Width	Shikiri Length	Shikiri Separation
1Kg / 3Kg / 5Kg / Basic (Wheeled)	154 cm	5 cm	2 cm	20 cm	20 cm
1 Kg (Legged)	124 cm	5 cm	2 cm	20 cm	20 cm

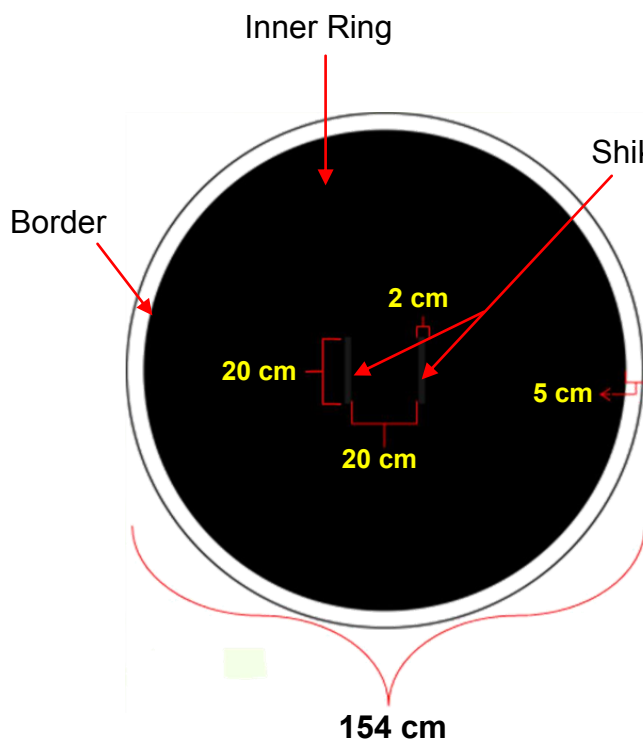


Figure 4. 1Kg / 3Kg / 5Kg / Basic (Wheeled) - Sumo Ring

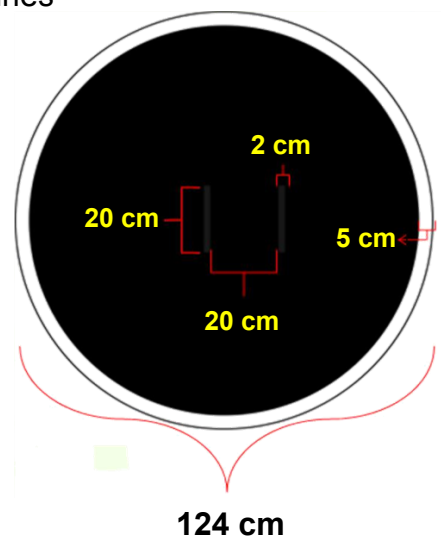
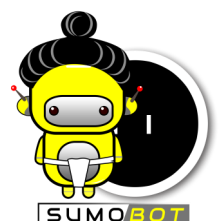


Figure 5. 1Kg Legged - Sumo Ring



4.1. Start

4.1.1. Placement of Robot During Match

- 4.1.1.1. At the start of the game, two players will approach the ring and prepare their robot. They will be given 1 minute service time to prepare the robot before the game starts.
- 4.1.1.2. Players will be asked to place their robot on the ring. The decision of who will place the robot first will be decided via a toss coin for the first match.
For RC, Extreme and All Japan Sumo, the players place their robot the same time (simultaneously).
- 4.1.1.3. Players are allowed to place their robots in any area of their segment behind the Shikiri lines (see placement guide below).

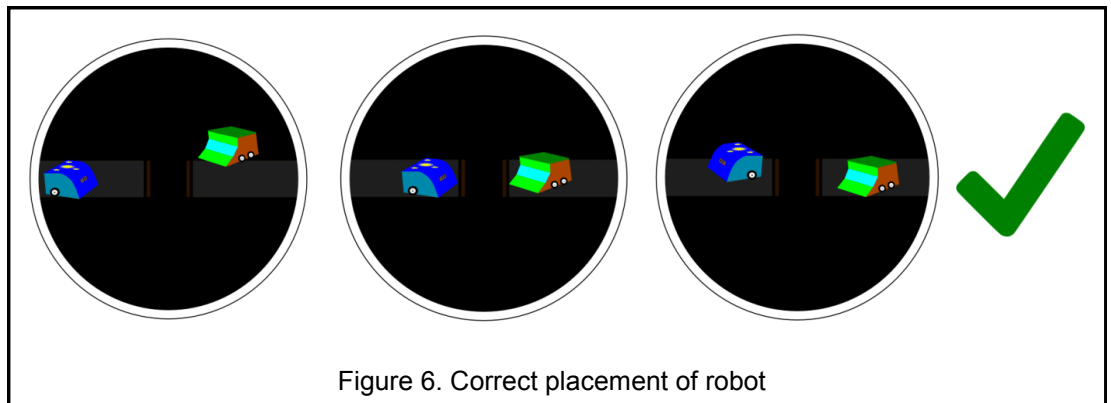


Figure 6. Correct placement of robot

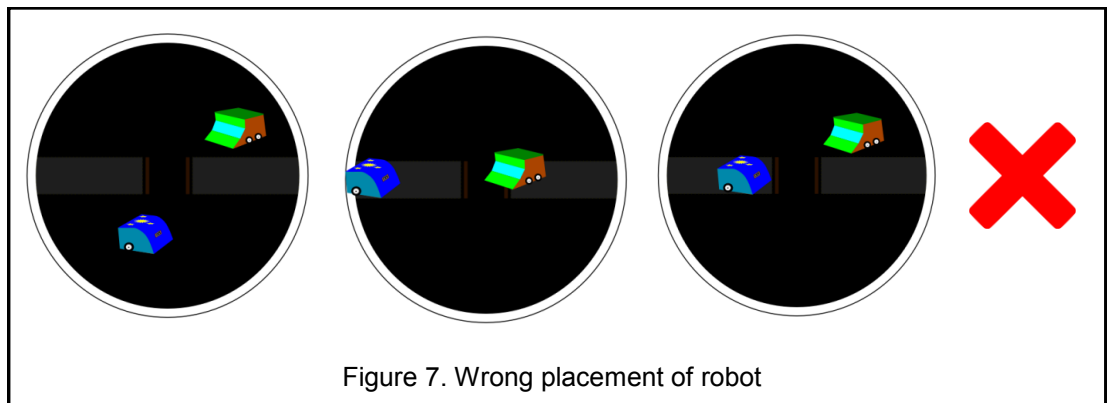
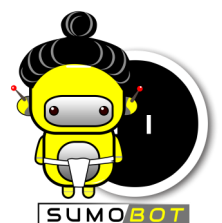


Figure 7. Wrong placement of robot

- 4.1.1.4. One player places his/her robot first then the second player places his/her robot while the first player watches. Adjusting the position of the robot after the placement is NOT allowed.
- 4.1.1.5. For the succeeding matches, the winner of the previous match places the robot first. In the event of a draw, the order of placement in the previous match is followed.



4.1.2. Robot Control

For the Autonomous Sumobot

4.1.2.1. The robot is to be started with a single toggle-type switch or push switch.

For extreme and All Japan Sumo, the robot should be started and ended with a remote controller.

4.1.2.2. After the signal of the referee (whistle), both players must press the switch of the robot. Players must leave the sumobot platform after.

4.1.2.3. After pressing the switch, the robot must move after the 5 seconds delay.

For the Remote Controlled Sumobot

4.1.2.4. The robot shall be remotely controlled with any form of wireless controller. No external physical intervention is allowed.

4.1.2.5. Participants should take the necessary considerations of their own wireless remote control interferences if any. Organizers will not be responsible for outside wireless interferences.

4.1.2.6. After the signal of the referee (whistle), both players must start to control their robot wirelessly.

4.1.3. False Start

4.1.3.1. A false start is called when at the start of the round, the player fails to turn ON the robot.

4.1.3.2. During a false start, the player must take the robot immediately during the 5-second delay and inform the referee "FALSE START".

4.1.3.3. When the 5 seconds have passed, a false start can no longer be called. Rule 4.2.1.2. will apply.

4.1.3.4. The player CANNOT call two consecutive "FALSE START". On the second false start, the Yuhkoh point goes to the opponent.

4.2. Scoring

4.2.1. Yuhkoh Point

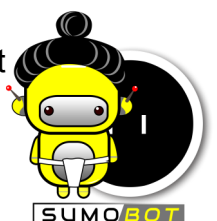
A Yuhkoh point is a reward to the winner of a round. How to win the Yuhkoh point?

4.2.1.1. When a robot moves before the 5-second delay requirement, the other robot gets the Yuhkoh point.

4.2.1.2. When a robot does not move or spins around on the same location for 5 seconds, the other robot wins the Yuhkoh point.

4.2.1.3. When the other robot falls off outside the ring. The robot that remained in the ring wins the point. This is valid even if NO CONTACT is made between the robots.

4.2.1.4. When a part of the robot falls off or separates from the body while in the ring, the other robot wins the point (except for nuts and screws).



- 4.2.1.5. When ALL the wheels of the robot are not touching the ring's surface, the other robot wins the point. (Rule 4.2.1.2. will apply)
- 4.2.1.6. When all rounds are completed and NO WINNER is found, the robot with the lighter weight gets the winning Yuhkoh.
- 4.2.1.7. When the player touches any part of the playing field or any robot in the game directly or indirectly during a round, the other robot wins the Yuhkoh point.

4.2.2. Draw

A round will be considered a draw:

- 4.2.2.1. When 60 seconds (including the 5 sec delay) has lapsed into the match.
- 4.2.2.2. When the referee cannot decide on which robot fell first.
- 4.2.2.3. When both robots are in a deadlock position for 10 seconds, a draw is called. A deadlock is when both robots contact without progress in the position.

Time-out

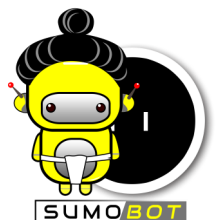
- 5.1. A player can only request 1 time-out for the whole game. Participants must signal a time-out to the referee at the end of a match.
- 5.2. During a time-out, the player who requested a timeout can service the robot while the robot of the other player must stay on the ring.
- 5.3. The robot can be repaired. Batteries CANNOT be changed. Adding of parts and programming the robot are NOT allowed.
- 5.4. The layers MUST place the robot on the ring before the end of the 1-minute time-out. The referee signals the end of a time-out.

Declaring Objections

- 5.5. A Player that continues to hold the robot beyond 1-minute time-out and after the referee signal will lose the match.
- 6.1. Only players can state an objection to the call of a referee. COACHES CANNOT INTERFERE.
- 6.2. The player in the field calls the attention of the referee and say "I OBJECT!".
- 6.3. A table official/judge is called to the field in front of the two players and the referee.
- 6.4. The objection is stated to the referee and the judge witnessed by the other player.
- 6.5. The judge makes a FINAL DECISION within 60 seconds.

Penalties

- 7.1. Sportsmanly conduct is expected from players. Any misconduct, act of cheating, foul language or intentional action to harm the opponent or the robot shall be dealt with by the judges with the recommendation of the referee.
- 7.2. Penalties can range from losing a match, a game or being banned from the game.



History of Changes

Date	Section	Description
07/18/2018	2.1.1	ADDED a row for 1Kg and 3Kg Wireless RC in Table 1. EDITED robot dimension of INEX ATX2 Sumobot Kit in Table 1.
	2.2.2	ADDED a rule for sensor limitations on ATX2 Standard Sumobot Kit.
	2.2.14	EDITED the section to specify the game categories which are not allowed to use external motor driver.
	3.1.1	ADDED a line for the type of sumo ring to be used in Extreme and All Japan Sumo
	4.1.1.2	EDITED the line on robot placement for RC, Extreme and All Japan Sumo.
	4.1.2.2	ADDED an instruction after starting the robot.

