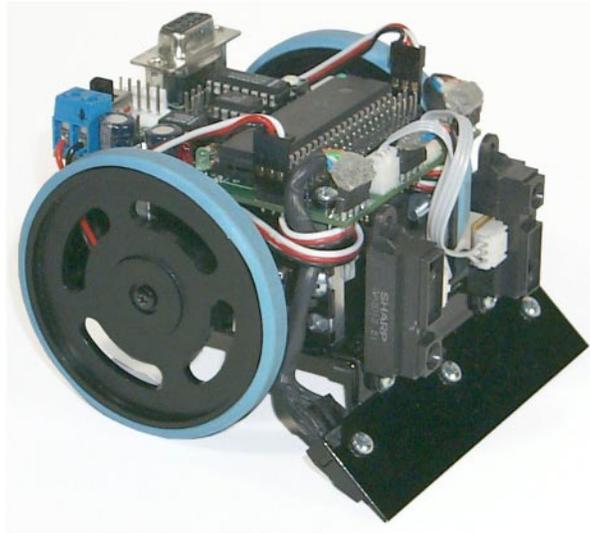


# **PDXBOT**

## **Sumo Tournament Rules**



**Mark III**

These rules are based on Bill Harrison's Northwest Robot Sumo Rules, which are based on the official rules of the All Japan Robot Sumo Tournament, submitted by Fujisoft ABC Inc.

Last Update: 2/2/2004

*<http://www.portlandrobotics.org>*



## Overview

This booklet contains the rules governing game play, robot construction, and playing arena layout for Portland Area Robotics Society Sumo competitions. These rules cover the Japan, Mini, and Micro size/weight classes.

### Robot Specifications

1. A robot must fit within a square tube of the appropriate dimensions for the given class.

<b>Class</b>	<b>Height</b>	<b>Width</b>	<b>Length</b>
Japan	unlimited	20	20
Mini Sumo	unlimited	10	10
Micro Sumo	5	5	5
Nano Sumo	2.5 (cm)	2.5 (cm)	2.5 (cm)

2. The total mass of a robot at the start of a match must be under the designated weight for the given class.

<b>Class</b>	<b>Grams</b>
Japan	3,000
Mini Sumo	500
Micro Sumo	100
Nano Sumo	25

3. The robot must be autonomous. Any method of control may be used, as long as it is fully contained within the robot. Robot operation must begin automatically no less than five seconds after being started by the user.
4. A number will be assigned during registration. Display or number on your robot to allow spectators and officials to identify your robot.

### Specifications of Sumo Ring

#### Material

Japan Class ..... Polyurethane coated steel plate

Mini Class ..... High pressure laminate coated wood

Micro Class ..... Melamine composite

#### Color

Inside the ring ..... Black

Shikiri line .... Brown, or equivalent for IR absorption

Outside border ..... White

Illuminance on the ring surface ..... Under 1,000 luxes

## Section 1. Definition of the Sumo Match

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**Article 1. [Definition]** A match is fought between two teams, each team having one or more contestants. Only one team member may approach the ring; other team members must watch from the audience. In accordance with the game rules (hereafter referred to as “these rules”), each team competes on a Dohyo (sumo ring) with an autonomous robot that they have constructed themselves to the specifications in Section 3. The match starts at the judge's command and continues until a contestant earns two Yuhkoh points. The judge determines the winner of the match.

## Section 2. Requirements for the Dohyo (Sumo Ring)

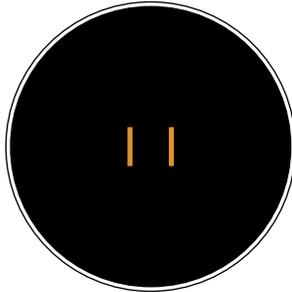
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**Article 2. [Dohyo Interior]** The dohyo interior is defined as the playing surface surrounded by and including the border line. Anywhere outside this area is called the dohyo exterior.

### Article 3. [Dohyo Specifications]

1. The ring shall be circular in shape and of the appropriate dimensions for the given size class.

Class	Min Height	Diameter
Japan	5.00	154.0
Mini Sumo	2.50	77.0
Micro Sumo	1.25	38.5
Nano Sumo	0.625 (cm)	19.25 (cm)



- Shikiri lines (starting lines) consist of two painted parallel brown (or equivalent for absorption of IR light) lines centered in the ring with appropriate width and spacing for the given class. The separation distance between the lines is measured to their outside edges.

<b>Class</b>	<b>Width</b>	<b>Length</b>	<b>Separation</b>
Japan	2	20	20
Mini Sumo	1	10	10
Micro Sumo	0.5	5	5
Nano Sumo	0.25	2.5	2.5
	(cm)	(cm)	(cm)

- The border line is marked as a white circular ring of a width appropriate for the given class on the outer edge of the playing surface. The ring area extends to the outside edge of this circular line.

<b>Class</b>	<b>Width</b>
Japan	5
Mini Sumo	2.5
Micro Sumo	1.25
Nano Sumo	0.625
	(cm)

**Article 4. [Dohyo Exterior]** There should be a space appropriate for the given class outside the outer edge of the ring. This space can be of any color except white, and can be of any material or shape as long as the basic concepts of these rules are not violated. This area, with the ring in the middle, is to be called the: “ring area”. Any markings or parts of the ring platform outside the minimum dimensions will also be considered in the ring area.

<b>Class</b>	<b>Width</b>
Japan	100
Mini Sumo	50
Micro Sumo	25
Nano Sumo	12.5
	(cm)

### **Section 3. Requirements for Robots**

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#### **Article 5. [Robot Specifications]**

- A robot may expand in size after a match begins, but must not physically separate into pieces, and must remain a single centralized robot. Robots violating these restrictions shall lose the match. Screws, nuts, and other robot parts with a total mass of less than 5 grams falling off from a robot's body shall not cause the loss of match.
- The robot must be autonomous. Any control mechanisms can be employed, as long as all components are contained within the robot and the mechanism does not interact with an external control system (human, machine, or otherwise).
- The robot must not start operating for a minimum of five seconds after initiation by the user.
- The robot must have a name or number for registration purposes. Display this name or number on your robot to allow spectators and officials to identify your robot.

#### **Article 6. [Robot Restrictions]**

- Jamming devices, such as IR LEDs intended to saturate the opponents IR sensors, are not allowed.
- Parts that could break or damage the ring are not allowed. Do not use parts that are intended to damage the opponents robot or it's operator. Normal pushes and bangs are not considered intent to damage.
- Devices that can store liquid, powder, gas or other substances for throwing at the opponent are not allowed.

4. Any inflaming devices are not allowed.
5. Devices that throw things at your opponent are not allowed.
6. Sticky substances to improve traction are not allowed. Tires and other components of the robot in contact with the ring must not be able to pick up and hold a standard 3"x5" index card for more than two seconds.
7. Devices to increase down force, such as a vacuum pump or magnets, are not allowed on the Mini or Micro classes. The Japan class may use such devices.
8. All edges, including but not limited to the front scoop, must not be sharp enough to scratch or damage the ring, other robots, or players. In general, edges with a radius of greater than .005", as would be obtained with a unsharpened .010" thick metal strip, should be ok. Judges or competition officials may require edges that they deem too sharp to be covered with a piece of tape.

## **Section 4. How to Carry Sumo Matches**

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### **Article 7. [How to Carry Sumo Matches]**

1. One match shall consist of 3 rounds, within a total time of 3 minutes, unless extended by the judges.
2. The team who wins two rounds or receives two “Yuhkoh” points first, within the time limit, shall win the match. A team receives a “Yuhkoh” point when they win a round. If the time limit is reached before one team can get two “Yuhkoh” points, and one of the teams has received one Yuhkoh point, the team with one Yuhkoh point shall win.
3. When the match is not won by either team within the time limit, an extended match may be fought, during which the team who receives the first Yuhkoh point shall win. Alternatively, the winner/loser of the match may be decided by judges, by means of lots, or by a rematch.
4. One Yuhkoh point shall be given to the winner when the judges' decision was called for or lots were employed.

## **Section 5. Start, Stop, Resume, End a Match**

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**Article 8. [Start]** Upon the judge's instructions, the two teams bow to each other in the outer ring, approach the ring, and place a robot within their half of the ring on or behind the Shikiri line. (A robot or a part of a robot may not be placed beyond the front edge of the Shikiri line toward the opponent. Note that is not required that a robot be placed directly behind the Shikiri line; it may be offset to the side, as long as it is behind an imaginary line colinear with the Shikiri line.) When the judge announces the start of the round, the teams start their robots, and after a five second pause the robots may start operating. During these five seconds, players must clear out of the ring area.

**Article 9. [Stop, Resume]** The match stops and resumes when a judge announces so.

**Article 10. [End]** The match ends when the judge announces so. The two teams retrieve the robots from the ring area, and bow.

## **Section 6. Time of Match**

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**Article 11. [Time of Match]** One Match will be fought for a total of 3 minutes, starting and ending upon the judge's command. The clock shall start ticking five seconds after the start is announced.

**Article 12.** An extended match, if called for by the judge, shall last for a maximum of 3 minutes.

**Article 13.** The following are not included in the time of the Match:

1. The time elapsed after the judge announces Yuhkoh and before the match resumes. The standard delay before the match resumes shall be 30 seconds.
2. The time elapsed after a judge announces to stop the match and before the match resumes.

## **Section 7. Yuhkoh**

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**Article 14. [Yuhkoh]** One Yuhkoh point shall be given when:

1. A team legally forces the body of the opposing robot to touch the space outside the ring, which includes the side of the ring its self.
2. A Yuhkoh point is also given in the following cases:
  1. The opposing robot has touched the space outside the ring on its own.
  2. Either of the above takes place at the same time that the end of the Match is announced.

3. When a robot has fallen over on the ring or in similar conditions, Yuhkoh will not be counted and the match continues.
4. When judges' decision is called for to decide the winner, the following points will be taken into considerations:
  1. Technical merits in movement and operation of a robot
  2. Penalty points during the match
  3. Attitude of the players during the match
5. The match shall be stopped and a rematch started under the following conditions:
  1. The robots are entangled or orbiting each other with no perceivable progress for five seconds. If it is unclear whether progress is being made or not, the judge can extend the time limit for observable progress for up to 30 seconds.
  2. Both robots move, without making progress, or stop (at the exact same time) and stay stopped for five seconds without touching each other. However, if one robot stops its movement first, after five seconds it will be declared as not having the will to fight. In this case the opponent shall receive a Yuhkoh, even if the opponent also stops. If both robots are moving and it isn't clear if progress is being made or not, the judge can extend the time limit up to 30 seconds.
  3. If both robots touch the outside of the ring at about the same time, and it can not be determined which touched first, a rematch is called.

## **Section 8. Violations**

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**Article 15. [Violations]** Players performing any of the deeds described in Articles 6, 16, or 17, shall be declared in violation of these rules.

**Article 16. [Insults]** A player who utters insulting words to the opponent or to the judges or puts voice devices in a robot to utter insulting words or writes insulting words on the body of a robot, or performs any insulting action, is in violation of these rules.

**Article 17. [Minor Violations]** A minor violation is declared if a player:

1. Enters into the ring during the match, except when the player does so to take the robot out of the ring upon the judge's announcement of Yuhkoh or stopping the match. To enter into the ring means:
  1. A part of the player's body is in the ring, or
  2. A player puts any mechanical kits into the ring to support his/her body.
2. Performs the following deeds:
  1. Demands to stop the match without appropriate reasons.
  2. Takes more than 30 seconds before resuming the match, unless the judge announces a time extension.
  3. Starts operating the robot within five seconds after the judge announces the start of the match.
  4. Does or says that which disgraces the fairness of the match.

## **Section 9. Penalties**

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**Article 18. [Penalties]** Players who violate these rules by performing the deeds described in Articles 6 and 16 shall lose the match. The judge shall give two Yuhkoh points to the opponent and order the violator to clear out. The violator is not honored with any rights.

**Article 19.** Each occasion of the minor violations described in Article 17 shall be accumulated. Two of these

violations shall give one Yuhkoh to the opponent.

**Article 20.** The violations described in Article 17 shall be accumulated throughout one match.

## **Section 10. Injuries and Accidents During the Match**

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**Article 21. [Request to Stop the Match]** A player can request to stop the game when he/she is injured or his/her robot had an accident and the game cannot continue.

**Article 22. [Unable to Continue the Match]** When the game cannot continue due to player's injury or robot's accident, the player who is the cause of such injury or accident loses the match. When it is not clear which team is the cause, the player who cannot continue the game, or who requests to stop the game, shall be declared as the loser.

**Article 23. [Time Required to Handle Injury/Accident]** Whether the game should continue in case of injury or accident shall be decided by the judges and the Committee members. The decision process shall take no longer than five minutes.

**Article 24. [Yuhkoh Given to the Player who Cannot Continue]** The winner decided based on Article 22 shall gain two Yuhkoh points. The loser who already gained one Yuhkoh point is recorded as such. When the situation under Article 22 takes place during an extended match, the winner shall gain one Yuhkoh point.

## **Section 11. Declaring Objections**

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**Article 25. [Declaring Objections]** No objections shall be declared against the judges' decisions.

**Article 26.** The lead person of a team can present objections to the Committee, before the match is over, if there are any doubts in the exercising of these rules. If there are no Committee members present, the objection can be presented to the judge before the match is over.

## **Section 12. Miscellaneous**

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**Article 27. [Flexibility of Rules]** As long as the concept and fundamentals of these rules are observed, these rules shall be flexible enough to encompass changes in the number of players and of the contents of matches.

**Article 28. [Change in Rules]** Any changes to or obsolescence of these rules shall be decided by the Portland Area Robotics Society Rules Committee.