

# MEGA SUMO COMPETITION RULES



## 1. Introduction

This document outlines the rules for the Mega Sumo robot competition.

## 2. Description of the Competition

One operator and four helpers can be registered for each robot (maximum 5 team members in total). However, only one operator and one helper may guide the robot during the match. The area where matches take place is called the Dohyo. Both contestants who are called to the Dohyo for the match accept the competition rules and winning conditions, and must participate using only autonomous robots that they have built and/or programmed themselves.

The robots are placed on the Dohyo simultaneously at the referee's command. Competitors step away from the robots, and the referee starts the match via infrared (IR) remote control. The robot that manages to push its opponent off the Dohyo wins a round. The robot that wins two rounds is declared the winner of the match.

### 2.1. Fixture

The competition format is determined by the organizers according to the number of participants. If participation is high, subgroups are formed. In group stages, robots are divided into groups of 3, 4, or 5. One or two robots with the highest scores advance to the next round. Re-matching is performed among robots advancing to the next rounds and continues until at most 8 robots remain. Subsequent stages may be organized either as a points league or knockout:

Points: Each robot competes with the others and earns points equal to the number of rounds won.

Knockout: Quarter-finals, semi-finals, third-place match, and final are held.

### 2.2. Classification and Rating

Fibonacci International Robot Olympiad Mega Sumo competitions take care to classify and grade by taking into account education level and age groups. It can be divided into 2 basic groups: high school (16-18) and university (18+). The age group and education level of the team is determined by the age or education level of the oldest member of the team. **It is the responsibility of the team mentor to ensure that teams are registered in the correct age category.** If during the competition it is determined that the team is registered in the wrong age category, the robot of this team will be **disqualified from the competition**.

**Note:** Teams in the younger age group are allowed to compete in the older age group. The organizers reserve the right to check the age of contestants during the competition. In case of violation, the robot of the team that violated the rules will be **disqualified**.



### 3. Competition Field Description (Dohyo)

Matches are held on a round steel field with a diameter of 154 cm and thickness 5 mm. The field is painted with a 144 cm black circle in the center, with the remaining area white. The white line on the outside is called Tawara and is 5 cm wide. The central area is matte black. The Dohyo is positioned approximately 5 cm above the ground. Shikiri-Sen starting lines are marked near the center to determine starting positions.

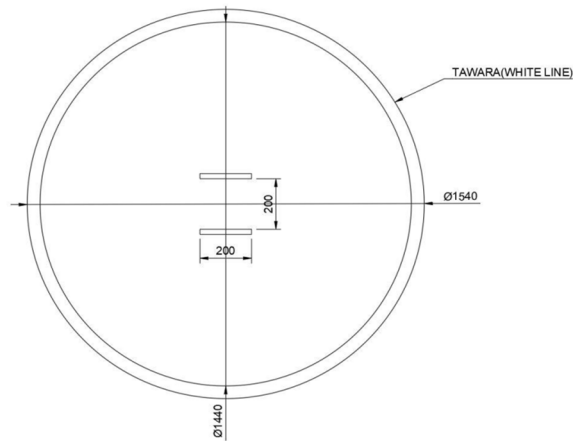


Figure 1: Dohyo Dimensions

Class	Height	Diameter	Materiel
Mega Sumo 3000gr	2 - 5cm	154cm	Steel

Table 1: Sumo Course Parameters

#### 3.1. starting area

At the start, robots are placed in line with the referee's instructions on the Shikiri-Sen. Once placed, robots cannot be moved. In unclear cases such as a draw, the referee may order a different starting position.

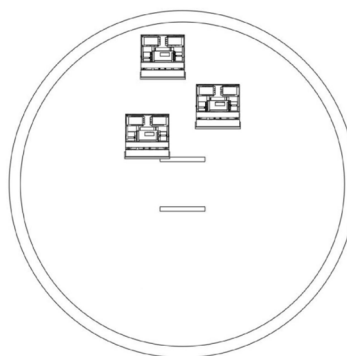


Figure 2: Starting positions of robots



## 4. Robot

**4.1 Dimensions and Weight:** Mega Sumo robots must have a maximum width and length of 20 cm and a maximum weight of 3 kg. There is no height limit.

Class	Weight	Length*	Width*	Height*
Mega Sumo	3000gr	20cm	20cm	There Are No Limits

Table 2: Size and Weight Limitations

**4.2 Integrity / Part Loss:** Robots cannot split, leave, or throw any parts during the match. Teams must secure components so they cannot fall off. If parts of 200 g or more fall off the robot, the round is lost.

**4.3 Expansion:** “Expansion” includes any unfolding, extending, or raising/lowering of flags or other attachments that increases the robot’s ground projection or changes its geometry. Robots may expand only after a valid IR Start command (start-module LED solid on), in at most two horizontal directions, up to 25 cm per direction; the robot must remain a single piece. Any expansion before the Start command—including flag movement—results in immediate round loss without warning.

**4.4 Anti-sensor / Jamming Devices:** Equipment that affects or blinds opponent sensors (e.g., flashers, mirrors, beams, ultrasound, etc.) is prohibited.

**4.5 Damage, Sharpness, and Surface Protection:** Normal pushing/collisions are permitted. Beyond this, components that could damage the opponent robot or the Dohyo (e.g., hard tips capable of scratching/gouging the surface, abrasive treads, high-speed rotating parts, etc.) are prohibited. Sharp edges are not allowed; the referee may require such edges to be taped/covered if deemed necessary. Any robot that actually damages the Dohyo surface during the match is deemed to have lost the match without warning (referee/chief referee decision prevails).

**4.6 Ring Surface Damage:** “Robots may not include any component that can scratch, cut, or otherwise damage the Dohyo surface; violations may result in disqualification for that match.”

**4.7 Liquids, Dust, Gas:** Using liquids, powders, or gases as weapons is prohibited.

**4.8 Flammable Materials:** The use of flammable substances is prohibited.

**4.9 Restraining Mechanisms:** Mechanisms that restrict the opponent’s movement (nets, ropes, tying, etc.) are prohibited.

**4.10 Traction & Downforce:** Adhesives are prohibited. Wheels or any parts in contact with the ring must not be able to lift and hold an A4 sheet of 80 g/m<sup>2</sup> for more than 2 seconds. Increasing downforce with vacuum or electromagnets is allowed.

**4.11 Flags (Optional):** Robots may carry flags (max 25 × 25 cm). If a flag detaches and leaves the Dohyo, the robot loses the round.

**4.12 Mid-match Changes:** Software changes between rounds of the same match are not allowed.

**4.13 Start Module:** Matches must start via the IR start module (see Appendix 1).

**4.14 Sensor Range:** If a robot detects a person/object beyond 154 cm, turns toward it, and exits the ring by itself before engaging the opponent, it loses the round; objections in such cases will not be accepted.

**4.15 Blade/Scoop Color:** The robot’s blade, scoop, or extensions must **not** be white.”



## 5. Match Rules

**5.1** Teams must be in the competition area, ready to compete, within 3 minutes after their robots are announced. Otherwise, the match starts and the absent side loses the round.

**5.2** After the match starts, each side has 1 minute to prepare. At the end of this period, both teams must be present next to the Dohyo with their robots. The side not present is eliminated.

**5.3** Each team has one 5-minute technical timeout per match. During this timeout, only limited maintenance/repair may be performed: only one assistant may enter the field; the contestant already on the field may not leave, and the robot may not be taken out of the field or handed out. Interventions must be completed quickly, not provide a performance advantage, and be necessary for the robot to continue operating (e.g., fixing a wheel connection, bringing a nonworking IR start sensor into operation, replacing it). Battery changes and blade changes—or any similar advantage-providing actions—are prohibited; if the blade loosens or detaches, it may not be reattached. In doubtful cases, the referee/chief referee's decision prevails; violations result in round loss.

**5.3.1** If the opposing team also wishes to intervene in their robot, they must use their timeout simultaneously.

**5.4** The referee decides the lineup for each round. After preparation time ends, the referee explains the lineup, and upon countdown, both sides place their robots on the Dohyo simultaneously.

**5.5** After placement on the Dohyo, no intervention with the robots is allowed.

**5.6** Start-Inactivity Rule: Within 5 seconds after the referee's Start command, each robot must either move at least 5 cm on the Dohyo or perform a permitted expansion/flag action. A robot that fails to do so is deemed inactive and loses the round. If one robot is inactive under this rule and the opponent shows movement within the 5-second window, the round is awarded to the moving robot—even if that robot later exits the Dohyo.

**5.7** Each round lasts a maximum of 30 seconds. If no winner emerges within this time, the referee stops the match and the round is replayed; if the robots collide and no advantage is established within 3 seconds, the round is also replayed. The referee may order at most 3 round replays in a match; if there is still no decisive outcome, the clearly aggressive robot (the one taking the initiative, sustaining the push, and attempting to force the opponent out) is awarded the match point. If there is no clear superiority, the robot that first touches a bottle placed at the center of the field wins the match point.

**5.8** The robot that pushes its opponent outside the Dohyo wins the round. If both robots go out together, the pushing robot scores the point.

**5.9** If a robot becomes immobilized (e.g., flips over, wheels lifted) the other side wins the round.

**5.10** The robot that wins two rounds wins the match.



## 6. Objections

The juries' decisions are final and not subject to subsequent review. If a solution cannot be reached with the juries, objections must be submitted immediately to the Fibonacci International Robot Olympiad Chief Referee. Complaints made after this point will not be accepted. In case of disagreement, the final decision will be made by the Juries and/or organizers.

**Note:** Rude behavior will not be tolerated. A team that does not respect the decisions of the judges, referee or chief referee may be disqualified by the referee and/or event organizers.

**6.1** Competitors cannot raise objections due to field factors after the round has started. These factors are eliminated by the referees with warnings made before the round.

**6.2** The competitor may make a verbal objection to the referee regarding the result of a round immediately upon the end of that round. Once the next round begins, the competitor's right to make a verbal objection concerning the previous round expires. Objections will not be accepted after the match point has been recorded in the system.

**6.2.1** The contestant may present the evidence he/she has to the referee within the scope of the objection. The referee can decide according to his own logic when there is a situation outside the rules.

**6.2.2** After the rounds are over, the contestant may submit a written objection to the verbal objection decision until the next round begins. This objection must be written and submitted to the chief referee in the form of a petition.

**6.2.3** The chief referee makes final decisions on the objections made. Decisions cannot be appealed again.

**6.3** Competitors who do not comply with the referees' warnings or disrupt the course of the competition will be disqualified.

**6.4** Fibonacci robot competition reserves the right to make any changes it deems necessary in the rules.



## 7. Marking Robots

Robots must be checked by the referees before the tournament and labeled with number tags (Robot Number / Team IDs) . These stickers are provided by the competition organizers. The sticker cannot be placed on the robot or any other component that could interfere with the operation of the opponent's sensors. Before each new tour, robots must undergo technical control again.

## 8. Changes and Cancellations to the Rules

Changes and cancellations in the specifications are made by the main organizer of the competition in accordance with the regulations of the competition organizing committee.

## 9. Security Measures of the Competition

Class	gloves	Glasses
Mega Sumo	Necessary	Necessary

Table 3: Security Requirements

**9.1** During the competitions, competitors are required to wear protective gloves and protective glasses. The mentioned protective equipment will be loaned to the competition if the competitor does not have it, but it is recommended to bring your own equipment for hygienic reasons.

**9.2** Competitors will not be allowed into the competition area with any electronic device (e.g. phone, tablet, RF remote control).

**9.3** Interfering with robots without stopping the match is extremely dangerous. Competitors who intervene despite this will be disqualified.

**9.4** Robots with swollen batteries or leaked fluids cannot be raced. If dangerous situations such as short-circuiting or smoke are detected in a robot during the competition, the competition will be stopped and the robot will be disqualified.

## 10. Disclaimer

Mega Sumo Category is more dangerous than other categories due to the speeds the robots reach and the cutting elements they may contain, and competitors must work carefully and take the necessary precautions at every stage of the competition. Despite this, Fibonacci International Robot Olympiad Organizers disclaim all liability for any material damage or injury that may occur.



## Appendix 1. Launch Module

The same remote control system used in RobotChallenge competitions such as RobotSM in Europe also applies to the Fibonacci Robot Competition. The purpose of the system is to ensure that the round starts fairly and quickly. For safety purposes the system is equipped with a kill switch. The system is based on an infrared transmitter operated by the referee. Infrared receivers on the robots. RC5 protocol is used in the launch module. The infrared transmitter uses a Manchester encoded bitstream at 38KHz. The message payload sent from the referee controller consists of a 5-bit address and a 6-bit command, which includes the remote commands (programming, start and stop) and the Dohyo ID.

The following table lists the remote commands and their respective payload contents: Table 4 shows the Remote commands.

command	RC-5 Message Area
Programming	Address[4..0] = 0x0B, Command[5..1] = Dohyo ID
Start	Address[4..0] = 0x07, Command[5..1] = Dohyo ID, Command[0] = 1
Stop	Address[4..0] = 0x07, Command[5..1] = Dohyo ID, Command[0] = 0

Table 4: Control Codes

Programming commands are used to write a new Dohyo ID in infrared. Robots' receivers just before the match. The referee's infrared transmitters are equipped with separate low-power IR LEDs to ensure that only nearby robots can receive certain commands. The programmed Dohyo ID is used to filter start and stop commands.

The start and stop commands have the same message address, but only the first bit of the message is used to determine the command field action. The robot's infrared receivers must verify that the Message's Dohyo ID is the same as the one programmed into the robot, and if so, take the appropriate action. The components of the infrared receiver should be placed on the robot so that the robot can receive messages from all directions.

The robot or launch module must be equipped with clearly visible LEDs to verify whether the referee has received the command from the infrared transmitter.

When a programming command is sent from the referee controller, the LED on the start module should blink twice quickly. When a start command is sent from the referee controller, the LED on the start module remains permanently lit.

When a stop command is sent from the referee control, the LED on the start module begins to blink continuously. You can find more information about the remote control system here: <http://www.startmodule.com>.

