

# Mini Sumo Autonomous (MSA)

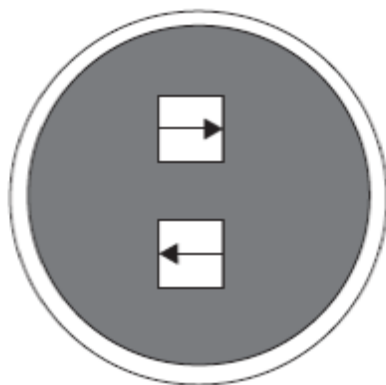
Effective September 11, 2019

Text in RED is new for 2020

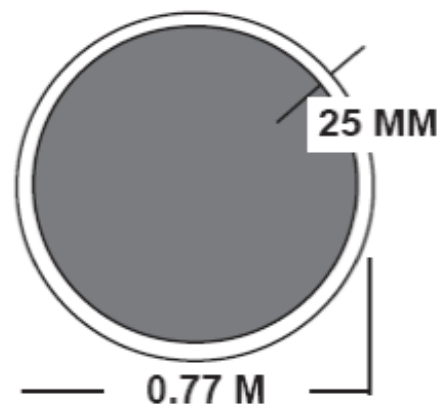
Code: MSA  
 Control: Autonomous  
 Open to: University (see below)  
 Max Robot Size: No size limit  
 Weight limit: 500 grams  
 Size of Playing Field: 0.77 meters (see details below)  
 Explanation: The object is for two robots to try to push each other out of the ring.

For robot size, weight, ring diameter and competitor eligibility [Top Grade Limit], consult the following table

Type	Class	Group	Max Size	Max Weight	Top Gr Limit	Ring Dia.
MB.Mini Sumo	Auto	MSA	No size limit	500g	University 1	0.77 m



Starting Positions



Preface: **The** Manitoba Robot Games (MRG) has opted not to follow the official FSI All Japan Robot Sumo Tournament (FSI-AJRST) rules. This has been done in order to tailor competitions to available components and facilitate greater competitor participation.

Match Definition: **A match** shall be a competition between two robots and comprising three rounds within a three minute match. Each robot must have a designated driver, and an alternate driver if the designated driver is entered into other competitions. The driver may not be changed within a match unless they are injured or become ill and cannot physically continue. Each robot attempts to push its opponent beyond the perimeter of the defined Sumo Ring (Playing field).

Playing field: **The** diameter of the Playing field is as specified in the above table. The border consists of a 25 mm white border at the edge and within the diameter of the playing field.  
**The** interior of the playing field is black in colour. The surface of the playing field is made of Sintra (foamed PVC) and sits a minimum of **71 mm** above ground level.

Robot Specifications: **There** are no restrictions to size of the robot.  
**The** maximum weight including accessories must be less than or equal to 500 grams as weighed on the scale provided by the MRG for registration for the competition. (It is highly recommended that a method be incorporated into the

robot design to adjust the weight if the intention of the team is to attain the maximum weight at registration).

**Any robot** found losing its body parts will also lose the match except for a screw or nut (of no larger than 1cm<sup>3</sup>).

**Autonomous** robots must contain all motivational intelligence within its structure.

**No** cues or instructions may be provided from outside the playing field once the round starts.

**Robots** are to be turned on or initialized by hand at the beginning of the match, then after a minimum of a **five** second delay the robot must take control of its own movement.

**Should** movement occur within the five second delay period, the robot will lose the round.

Restrictions: **Power** - No Fuel Cells allowed.

**If using** Lithium Ion, or Lithium Polymer batteries, please refer to Page 3 of the MRG General Rules to be sure your robot complies with those restrictions.

**The** robot shall be fitted with a single action **kill switch** prominent on the top of the robot, coloured red, and will, when pushed in a downwards motion and released, disconnect power to the motor(s), immobilizing the robot.

**The** robot shall not contain any electronic jamming devices to disturb your opponent's infra-red or ultra-sonic sensors.

**The** robot shall not contain parts that could break or damage the Playing field.

**Metal attack surfaces are strictly forbidden. "Attack surfaces" are the surfaces that are designed to contact the opponents robot with the intention to lift or reduce its traction, and especially if the surface is to scrape along the surface of the playing field.**

**The** robot shall not contain devices that can store solids, liquid, powder, or air and disperse it at your opponent.

**The** robot shall not contain any inflaming devices.

**The** robot shall not contain any sucking devices or glue to stick the robot down onto the Playing field.

Robot Identification: **The** MRG identification sticker(s) (as supplied while registering in the contest) must be placed on the robot so as to be easily readable on the robot's body while the robot is in competition.

Game Principles: **Each** match consists of up to three rounds with a total time of three minutes. **Each** round starts at the judge's command and continues until one robot pushes the opposing robot off the playing field or time expires.

**The** first team to win two rounds within the time limit is awarded the match.

**When** neither team can push the other off the playing field the winner will be decided by the judges based on displayed strategy or aggressiveness. However, if no obvious superiority exists and a winner cannot be determined, an extra one minute round may be played.

**The** judges will decide when a round is won

#### Game Procedure

Beginning of the Game: **At the** judge's instruction, the robots are placed in the playing field 10 to 15 cm apart and an equal distance from the centre of the playing field. The robots are set down parallel to each other and facing opposite directions so that autonomous robots must actively search for their opponent and not merely "steam roll" straight forward.

**The** team that places their robot in the Playing field first shall select the direction their robot is to face and the second robot placed within the playing field will be required to be placed facing the opposite direction.

**When** both contestants are ready, the judge will signal the start of the three minute match at which time the robots may be activated. No movement must

occur before the official start (i.e. no posturing). There must be a five second delay from the start signal until any motion of the robot occurs.

**A team** may halt the start, just once, no later than 10 seconds upon the start of one round without penalty. This allows for last moment emergencies (such as a competitor forgetting to plug in a battery). The start can be delayed no longer than 60 seconds.

End of the Game: **The match** ends when the judge announces the match is over.

Cancellation/Rematches: **The** round stops and resumes when a judge announces so. The round may also be cancelled and a rematch called for by the judges when:

**Both** robots are in a clinch and stop movements for 5 seconds, or move in the same orbit for 5 seconds with no progress being made.

**Both** robots move without making progress in locating the competing robot, or stop (at the exact same time) and stay stopped for 5 seconds without touching each other. If one robot stops its movement first, after 5 seconds it shall be considered not having the will to compete.

**If both** robots appear to touch the outside of the playing field at approximately the same time, and a judge cannot determine which robot touched first, a rematch may be called.

A successful round: Your robot may be awarded a round when:

- **You** have legally forced the body of your opponent's robot to touch the space outside the Playing field. A robot whose body, wheel, or other support hangs over the edge is not considered outside the Playing field until it physically tips or touches the surface beyond the Playing field perimeter.
- **Your** opponent's robot has tipped or touched the space outside the Playing field, on its own.
- **Either** of the above takes place at the same time that the End of the Match is announced.
- **Your** opponent's robot is disqualified or has had more than one violation or warning.
- **Your** opponent's robot becomes disabled (flipped on its back or side, for instance) and is unable to move in the Playing field.

**When** the judges' decision is called for to decide the winner, the following points will be taken into considerations:

- \* **Technical** merits in movement and operation of a robot.
- \* **Attitude** of the players during the match.
- \* **Which** robot exhibited the best effort.

Warnings: **Contests** WILL start within a reasonable time, once announced.

A contestant who takes any of the following actions will receive a warning...

- In the event a contestant fails to respond to the announced start time.
- The contestant(s) enters into the playing field during the match, except when the team does so to bring the robot out of the playing field upon the judge's announcement of a point or after the round/match is stopped. To enter into the playing field means a part of a team member's body is on or directly above the playing field.
- Halts the start of a round more than the one time allowed.
- A robot moves before the judges start signal.

**When a** contestant receives two warnings, the contestant's opponent will be awarded the match.

MRG General Rules: **Failure** to follow the MRG General Rules may result in the following:

- Warning** being issued, or
- Disqualification** and loss of the round, or
- Disqualification** from competition and or event.