SUMO 1KG BASIC

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Contents

Περιεχόμενα

1. General Match Information

1.1 Definition and Goal

- The competition simulates traditional Sumo wrestling. The goal is for your autonomous robot to push the opponent out of the ring (Dohyo). The match is won by the team that first accumulates two (2) Yuhkoh points.
- Team Participation
- Each match is conducted between two teams/robots.
- Only two (2) team members (the operator and the assistant) are allowed in the game area near the Dohyo.
- The operator can be changed ONLY between matches (against another team)
- The rest of the team members must watch the match from the audience.
- Video recording is allowed by the operator, the assistant, or another team member.

Characteristic	Limit	Notes
Mass (Maximum Weight)	<= 1Kg	During approval, the maximum weight is 1002g
Base Dimensions (Maximum Width/Length)	Must fit inside a 20cm- 20 cm square	During approval, a 20.20 cm – 20.20 cm template is used.
Autonomy	Mandatory	All control components must be inside the robot. External control (human, machine, etc.) is not allowed.
Extension	Allowed after start	Must remain a single robot. Physical separation into pieces is prohibited.
Dropping Small Parts	Allowed	Dropping screws/washers with a total mass of <5g does not result in a match loss.

2. Robot Specifications

2.1 Category Classifications

- **Construction Material:** Robot Athletes in the Wrestling Basic category are built exclusively from educational modular brick/beam kits (LEGO-like or equivalent). Indicative examples include: LEGO® Education EV3/SPIKE/Robot Inventor, ZMROBO, MAKERZOID, ENJOY AI, Makeblock mBot, DFRobot Maqueen, and similar.
- **Controller:** Must use the official hub/controller of the respective kit.
- **Connections:** All motor/sensor connections are made directly to the hub. The use of compatible cables is permitted (even if not original), provided they function identically to the manufacturer's standard cables without providing extra power or advantage.
- **Manufacturer Consistency:** The Robot Athlete must be constructed exclusively using parts and components from a single manufacturer. Mixing parts from different manufacturers (e.g., using LEGO parts combined with Makeblock parts) is strictly prohibited.
- **Allowed Components:** Components that are standard parts of the specific educational kit used (e.g., servo motors included in mBot kits) are permitted.
- **Prohibited Electronics:** External microcontrollers, motor drivers/ESCs, non-official adapters/converters (unless needed for compatibility within the same ecosystem), or additional power sources/boosters are not permitted.

2.2 Dimensions and Mass

- **Mass:** Maximum 1 kg (1000g). During approval, the maximum weight is 1002g. This includes all shields, extensions, and additional parts.
- **Starting Dimensions:** At the start of the match, the Robot Athlete must fit entirely inside the official control box: 20 cm x 20 cm (tolerance ±2 mm).
- **Extension:**
    - After the start, the Robot Athlete may expand forward, backward, and/or sideways.
    - Maximum Expanded Dimensions: Must never exceed 30 x 30 x 30 cm when in full extension on all sides.
    - Extension Type: Shields and extensions may be mechanical or deployable (e.g., lowered, expanded, or unfolded after the start).
    - Autonomy: The extension must be autonomous after the start of the match.

2.3 Power and Batteries

- Only the official batteries/power supplies provided with the educational kit are allowed. Modified batteries are prohibited.
- **Voltage Limit:** The use of external batteries, boosters, converters, or motor drivers that increase the voltage beyond the nominal rating of the official hub is strictly prohibited. The nominal voltages of these hubs must be up to 9V.

2.4 Shields and 3D Printed Parts

- **Allowed:** Robot Athletes are allowed to include 3D printed parts or other structural materials for protective shields and extensions at the front, rear, and/or sides.
- **Material:** Extensions/Shields must be constructed only from plastic or paper material.
- **Color Restriction:** Shields, extensions, and 3D-printed parts must NOT be white or light-colored. This is to avoid confusion with the arena boundary line (white ring) and to prevent interference with sensors and referee visibility.
- **Safety:** All shields and extensions must be safe: no sharp edges, no dangerous parts, and no elements that damage or wear down the arena surface.

2.5 Prohibitions (Strictly Enforced)

The following are strictly prohibited in all categories (unless specified):

1. **Pneumatics:** The use of pneumatic devices/equipment is prohibited.
2. **Pullback Motors:** Strictly prohibited (sport promotes engineering/experimentation).
3. **Gases:** Use of gases (canisters/equivalent) to increase speed/strength.
4. **Downforce Devices:** Devices to increase downward force (e.g., vacuum pumps, magnets, electromagnets) are PROHIBITED in this class (Only allowed in Mega Sumo).
5. **Omni Wheels:** The use of Omni Wheels is prohibited.
6. **Adhesives:** Sticky substances, tapes (welding, electrical, packaging), or suction cups on wheels. Tires must not lift and hold a standard A4 sheet of paper (80g/m2) for more than 2 seconds.
7. **Harmful Parts:** Parts that cause damage to the Dohyo, opponent, or operator.
8. **Jamming Devices:** Devices intended to interfere with opponent sensors (e.g., IR LEDs, blocking materials).
9. **Connectivity:** Remote control or connection (Bluetooth, Wi-Fi, etc.) to any external device during the match. Violation leads to a permanent ban.
10. **Separation:** Physical separation into pieces is prohibited. The robot must remain a single, unified unit.

2.6. Special Provision for LEGO Mindstorms EV3/NXT

Since LEGO Mindstorms EV3 and NXT systems have been discontinued, teams are permitted to use original or fully compatible (third-party) motors, sensors, cables, and bricks/controllers of the same type, provided that:

- They are connected to an EV3/NXT-type brick/controller (original or electrically compatible third-party).
- No additional microcontrollers, motor drivers, active converters, or custom electronic boards are used.

- All components remain in their original factory condition, without internal or external modification.
- The overall configuration clearly remains within the philosophy of an educational robotics kit and does not constitute a custom electronics build.

Clarification:
As the Power Functions extension cable is a passive connection cable that does not contain electronic circuitry and does not modify electrical characteristics, its use (original or compatible third-party) is permitted for the connection of Power Functions motors to the educational hub/controller.

3. The Dohyo (Ring) Specification

- Diameter: 80 cm (800 mm).
- Surface: Black wood with a White circular boundary ring (2.5 cm wide).
- Center: Black Frame
- Dohyo Area: There must be adequate space outside the outer edge.

4. Technical Inspection

Inspection is mandatory and includes:

1. **Start of Event:**

    1. Verification of robot category (Basic vs Advanced parts check).
    2. Dimension check (Fits in 20x20cm box).
    3. Extension check (Capability to stay within 30x30x30cm).
    4. Weighing (Max 1002g).
    5. Start Procedure check (Black frame logic for Basic).

2. **Before Each Match:**

    1. Dimension and weight spot-checks.
    2. Cleaning of wheels (Team responsibility).
    3. Check for prohibited items (White shields, magnets, etc.).

5. Match Conduct and Procedures

5.1 Start Procedure (Basic Category - Black Frame)

- **Placement:** The Referee places a Black Frame (e.g., cardboard) (Figure 1) between the Robot Athletes in the center of the arena, dividing it into sections.
- **Positioning:** Upon the referee's signal, technicians must place their Robot Athletes into their designated sections simultaneously.
- **Sensors:** Robot Athletes must be able to see the black frame and not make any movement until it is removed by the referee.
- **Arming:** The Referee signals the Technicians to press the Start button on their robots. Robots must go into standby mode.
- **Safety:** Technicians must move away from the arena (at least one step back).
- **The Start:** The Referee counts down "3, 2, 1, Let's go!" and lifts the black frame.
- **Action:** Robot Athletes should start moving immediately the moment the frame is lifted.

False Start/Delay: If a Robot Athlete does not start moving within 5 seconds of the frame lift, **one (1) restart is granted**. If it fails to move for a second time, the **point (Yuhkoh) is awarded to the opposing team**.

5.2 Match Duration and Scoring

- **Format:** Matches consist of 2 or 3 rounds. The first team to win two (2) Yuhkoh points wins the match.
- **Time Limit:** Total match time is 5 minutes.
- The team that wins the match receives 3 ranking points, while the losing team receives 0 points.
- Yuhkoh Point (Round Win): Awarded when:
    - The opponent is forced to touch the area outside the Dohyo.
    - The opponent exits the Dohyo on their own.
    - The opponent is disqualified or cannot continue (technical failure).
    - The robot remaining in the ring breaks or separates into pieces during the match, even if the opponent has already exited the Dohyo.
    - The opponent is unable to "fight": This includes cases where the opposing robot flips over and its wheels lose contact with the floor. In this event, the referee will count down three (3) seconds, granting the robot the right (via its programming) to autonomously right itself so that its wheels touch the arena floor again, provided that the opponent has not pushed it out during this time.
        - Note: If the robot that is fully capable of fighting exits the arena on its own while the referee is counting down, the countdown continues normally. If the flipped robot successfully demonstrates its self-righting capability, it is awarded the round win; otherwise, the point goes to the opposing team.

5.3 Rematch Conditions

A rematch is called if:

- Robots are tangled/immobile for 10 seconds.
    - Aggressiveness Criterion on Repeated Tangles: If the robots become tangled/immobile for a second (2nd) consecutive time, no further restart is granted. The referee stops the round and awards the point (Yohkoh) to the robot that demonstrated greater aggressiveness and pushing force during the engagement.
- Simultaneous exit (unclear winner).
- Both robots stop ("Loss of Spirit") for 5 seconds.
- One of the 2 robots fails to start **(ONLY one restart is allowed per team).**

5.4 Tie-breaking Rules

In the event that two (2) or more Robot Athletes are tied on points at the end of the group stage, their ranking and advancement to the next phase will be determined by applying the following criteria, in order of priority:

- **Total Wins:** The total number of matches won during this phase.
- **Fewest Losses:** The Robot Athlete with the fewest match losses during this phase takes precedence.
- **Head-to-head Points:** Points accumulated in the matches played exclusively between the tied Robot Athletes.

6. Violations and Penalties

6.1 Major Violations (Loss of Match/Disqualification)

- Use of prohibited components (Pneumatics, Remote Control, Magnets/Vacuum).
- Robot separation (intentional).
- Connectivity (Bluetooth/Wi-Fi active during match) -> Permanent Ban.
- Non-compliance with shield color rules (White shields) discovered during match.

6.2 Minor Violations (Warning)

Two minor violations result in giving 1 Yuhkoh point to the opponent.

- Entering the Dohyo during the match.
- Touching the robot after placement (except start button).
- Delays.
- Incorrect placement (robot not touching the white line)
- Premature start (robot moves before the frame is removed)

6.3 Objections & Protests Procedure

- **Requirement and Submission Deadline:** An objection cannot be filed without the submission of video footage recorded by the team itself. The objection must strictly be raised before the match score is officially registered.
- **Score Registration:** In the event that the score has already been registered, the decision is final and cannot be changed under any circumstances.
- **Final Decision:** The decisions made by the referees are definitive and final.

7. Repairs and Maintenance

- **During Match:** No repairs are allowed. If a part detaches unintentionally, the robot must continue without it. If the robot breaks down and cannot continue, the opponent wins.
- **Between Matches:** Batteries may be changed/charged, and parts repaired.
- **Cleaning:** Allowed only with wet cleaning cloths or cleaning liquid and paper. Cleaning with sticky tape is permitted, provided that the tires do not lift and hold a standard A4 sheet of paper (80g/m²) for more than 2 seconds.

8. Safety & Final Provisions

- **Disqualification:** If the referee determines the Robot Athlete does not comply with specifications after the start, they have the right to disqualify the team.
- **Flexibility:** Local organizers may publish modifications before the event.

9. Images

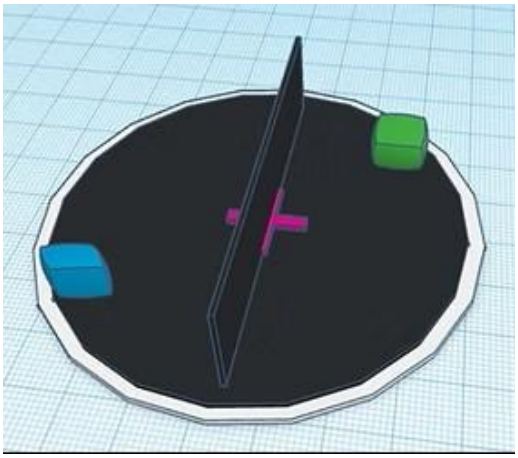

Figure 2