

World Robot League Humanoid Standard Regulation

Verification of Regulations

Sangbok Park
Chief Judge of IREA



1. Weight class

1-1. Weight class

class	Weight class
Minimum	Commercial products and self-made robots under -0.7 kg
Flyweight	Commercial products and self-made robots under -1.0 kg + minimum class standard robots
Bantamweight	Commercial products and self-made robots under 1.5 kg + flyweight class standard robots
Featherweight	Commercial products and self-made robots under 1.7 kg + bantamweight class standard robots
Lightweight	Commercial products and self-made robots under 2.0 kg + featherweight class standard robots
Middleweight	Commercial products and self-made robots under 2.5 kg + lightweight class standard robots
Heavyweight	Self-made robots under 3.5 kg and middleweight robots + middleweight class standard robots

1-1-1. The weight tolerance for "robot specifications" allows a deviation of up to **+3g**.

1-1-2. You can compete in a weight class one level higher while maintaining the "robot specifications" of one weight class below.

1-2. Commercial products

For other Commercial products, please inquire.

Class	Commercial products
Minimum	KKOK-DU , Meebot Etc
Flyweight	Withinno HURO , LINE-Core m, ROBOTIS MINI, RQ-HUNO, Alpha Mini Etc
Bantamweight	ROBOTIS ENGINEER MAX-E1, MF-17ST, 5720T-FMT, IRH-100, ROMANBO Etc
Featherweight	ROBOTIS ENGINEER MAX-E2, Tonybot , Alpha E1 Etc
Lightweight	STEAMCUP PREMIUM, ROBOTIS GP, TINYWAVE, TINYWAVE F, TINYWAVE AF, ROBOTIS ENGINEER MAX-E2, VH-19 IMMOTAL Etc
Middleweight	KHR-3HV, PLUTO, Super Anthony , MK I ~III Etc

1-2-1. 'Pre-made products' can participate in the corresponding weight class regardless of "robot specifications." Pre-made products refer to commercially available robots in their original state. However, changes such as batteries, cables, communication components, and cosmetic modifications that do not alter performance are permissible. Any modifications beyond these criteria fall under the "self-made" category and must comply with "robot specifications" regulations for participation.

1-3. Motor specifications

1-3-1. Motor torque limit: Stall torque should be within 11.1~12V, 1.4~1.5A

For other motors, please inquire.

Class	Stall torque	Types of motors
Minimum	Under 0.3N·m	Kittenbot LEGO Geek, XL330-M077, JRS201 Etc
Flyweight	Under 0.6N·m	Including motors for minimum weight class and below, LSM-micro, XL-320, SAM-3, XL330-M288, SG90 Etc
Bantam weight	Under 1.5N·m	Including motors for Flyweight class and below, WCK-1108T, WCK-1111T, MRS-D2009SP, IRS-430, XC330, XL430, 2XL430, 2Kg UBTECH Etc
Feather weight	Under 1.5N·m	Including motors for Bantam weight class and below, WCK-1108T, WCK-1111T, MRS-D2009SP, IRS-430, XC330, XL430, 2XL430, 2Kg UBTECH Etc
Light weight	Under 1.9N·m	Including motors for Feather weight class and below, AX-12A, AX-18A, XC430, VTS-19, LX-824HV, 3Kg UBTECH Etc
Middle weight	Under 6.0N·m	Including motors for Light weight class and below, MX-28, MX-64, XM430, XH430, XW430, XD430, KRS-2572R2HV, JS-R7, CAS-4880, CAS-5570, CAS-6550, AX-01, IQ4516HV Etc
Heavy weight	Under 8.4N·m	Including motors for Middle weight class and below, MX-106, XM540, XH540, XW540, XD540 Etc

1-3-2. Motors are considered the most critical components for determining weight classes, and therefore, any replacement or modification of parts for performance enhancement is strictly prohibited. Such actions are deemed serious violations that severely compromise fairness.

1-3-3. If the torque and speed of a motor are difficult to judge visually by the judges, they may request verification through firmware checks and internal inspection of the motor. Participants are expected to cooperate fully in such cases.

2. Robot standards

2-1. robot specifications inspection

2-1-1. All robots participating in the competition must complete the 'specifications inspection' within the allotted time. If a robot fails to pass the 'specifications inspection,' it will be disqualified according to the 'specifications inspection' regulations.

2-1-2. If changes and modifications to the robot are required after the 'specifications inspection,' the robot must be revised and re-inspected within the inspection time. Failure to comply will result in disqualification.

2-1-3. For a prompt and accurate specifications check, the 'specifications inspection' will be conducted with the power on and the robot fixed in the 'inspection posture.' See '② Inspection Posture' for reference. During this process, any measurement errors occurring from the robot not being properly fixed are the responsibility of the participant. Controllers should be brought if necessary

2-2. specifications inspection penalty

2-2-1. If modifications to the robot's specifications are not possible due to a participant's error, participation may be permitted within a 'total sum $\pm 10\%$ ' limit under the agreement of the 'judges' during the 'specifications inspection.'

2-2-2. In cases where the above 'penalty' regulation applies, the participant will compete with a '3-down' handicap in all matches. In the event of a tie after a match, the participant who received the 'penalty' will be considered the loser without any overtime.

2-2-3. When the judges disapprove or if a majority of participants oppose, the participant will be disqualified.

2-3. robot specifications

The allowable tolerance for exceeding the robot specifications length is '+1mm'

2-3-1. robot base platform

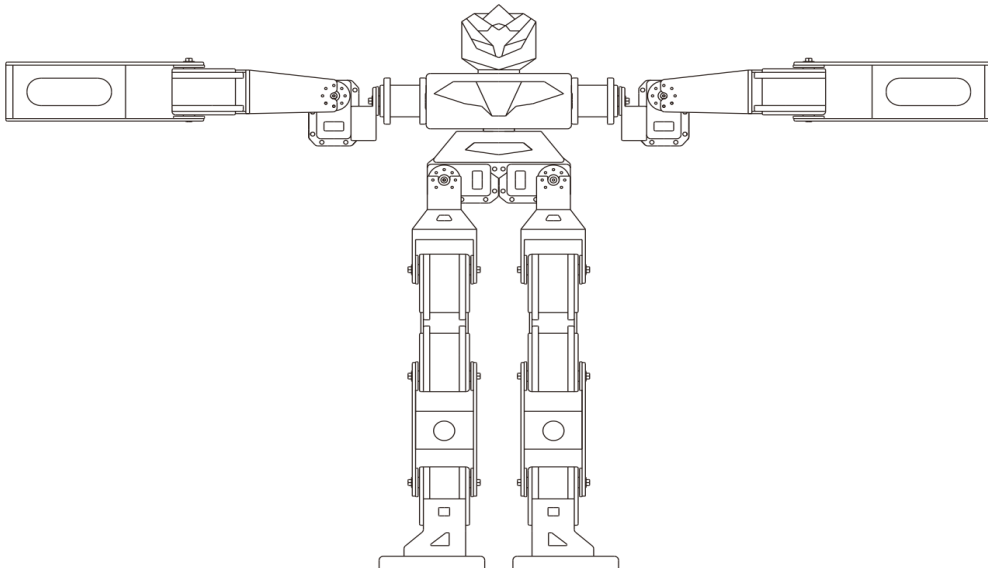
- Humanoid robots, which have a structure similar to humans with heads, torsos, arms, and legs, are eligible to participate only if they meet the 'robot specifications' regulations.

2-3-2. The height of the robot is measured as the straight-line distance from the 'top of the head' to the 'bottom of the feet.'

2-3-3. The 'specification posture' height of the robot is measured when the robot is fully extended.

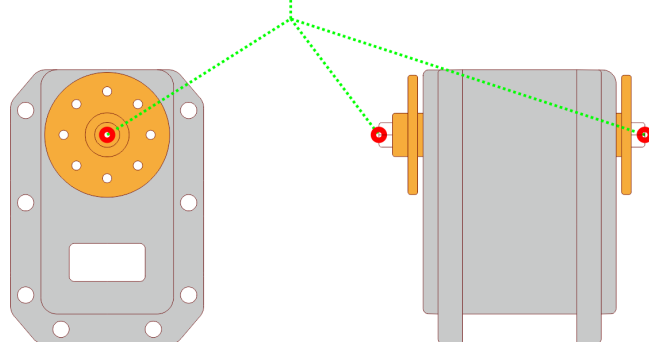
Class	The height limit in the 'specification posture'
Minimum	300mm or less
Flyweight	300mm or less
Bantam weight	400mm or less
Feather weight	400mm or less
Light weight	400mm or less
Middle weight	500mm or less
Heavy weight	500mm or less

- ① **specification posture** ✖ During the specification inspection, the robot must have its power turned on and be in the specified posture.



② specification reference point

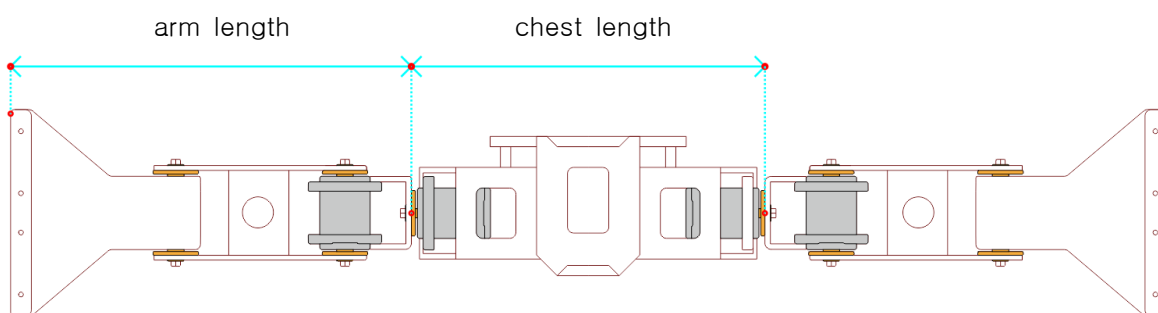
rotating axis



2-3-4. chest length : The length is measured as the straight-line distance between the outermost 'shoulder motor axes' of the torso. For vertical arm structures, measure the straight-line distance between the rotating 'hub and arm frame boundary.' For horizontal arm structures, measure the straight-line distance between the 'shoulder motor axes'.

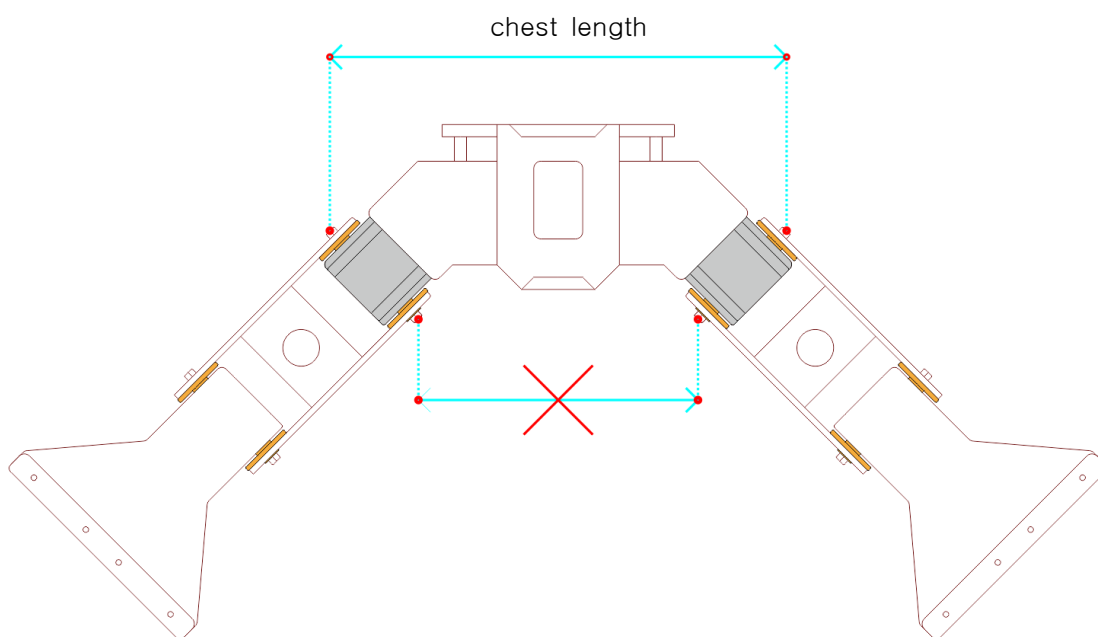
Class	chest length Limit
Minimum	100mm or less
Flyweight	100mm or less
Bantam weight	120mm or less
Feather weight	120mm or less
Light weight	120mm or less
Middle weight	160mm or less
Heavy weight	180mm or less

③ chest length and arm length of vertical arm structure



④ chest length of horizontal arm structure

single-joint shoulder



Please email us with attached photos for inquiries regarding other unique structures.

2-3-5. arm length : The arm length is measured as the straight-line distance from the 'shoulder axis' adjacent to the chest to the fingertips, **ensuring the condition is met in both arms parallel and arms extended postures.**

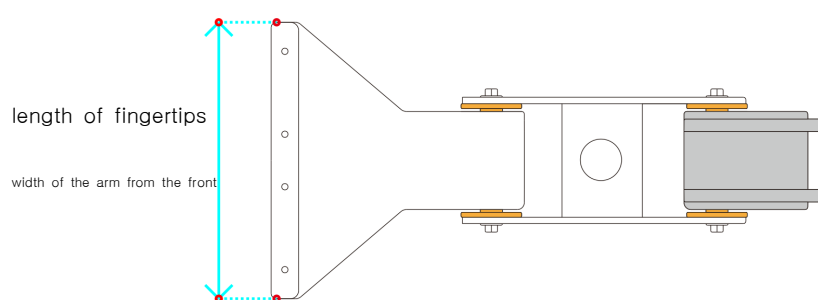
2-3-6. arm span : The 'arm span' is measured as the straight-line distance across the thickest part of the robot arm.

Class	arm length limit	arm span limit
Minimum	160mm or less	60mm or less
Flyweight	160mm or less	60mm or less
Bantam weight	200mm or less	60mm or less
Feather weight	200mm or less	60mm or less
Light weight	240mm or less	60mm or less
Middle weight	250mm or less	80mm or less
Heavy weight	260mm or less	100mm or less

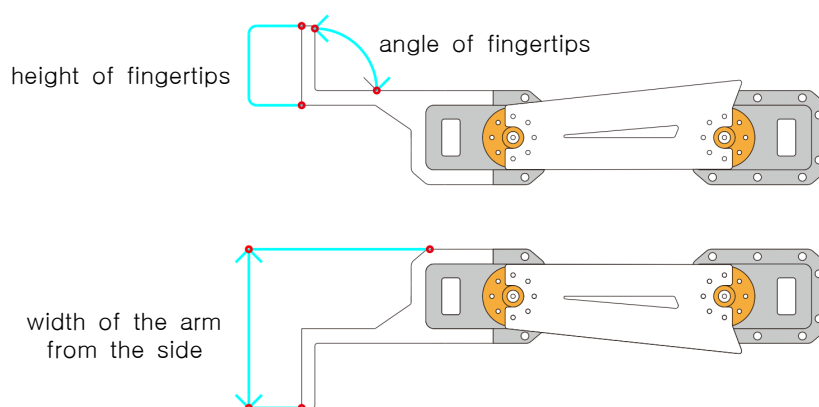
2-3-7. The size of the fingertips. : The length is measured as the straight-line distance of the 'fingertip' area capable of attacking opponent robots. When using grippers, **each 'fingertip' size must be manufactured according to specifications, and the maximum extended size cannot exceed the 'arm span limit'.**

Class	fingertip length Limit	fingertip height Limit	fingertip angle limit
Minimum	60mm or less	30mm or less	more than 90 degrees
Flyweight	60mm or less	30mm or less	more than 90 degrees
Bantam weight	60mm or less	30mm or less	more than 90 degrees
Feather weight	60mm or less	30mm or less	more than 90 degrees
Light weight	60mm or less	30mm or less	more than 90 degrees
Middle weight	100mm or less	30mm or less	more than 90 degrees
Heavy weight	100mm or less	30mm or less	more than 90 degrees

5 length of fingertips, width of the arm from the front



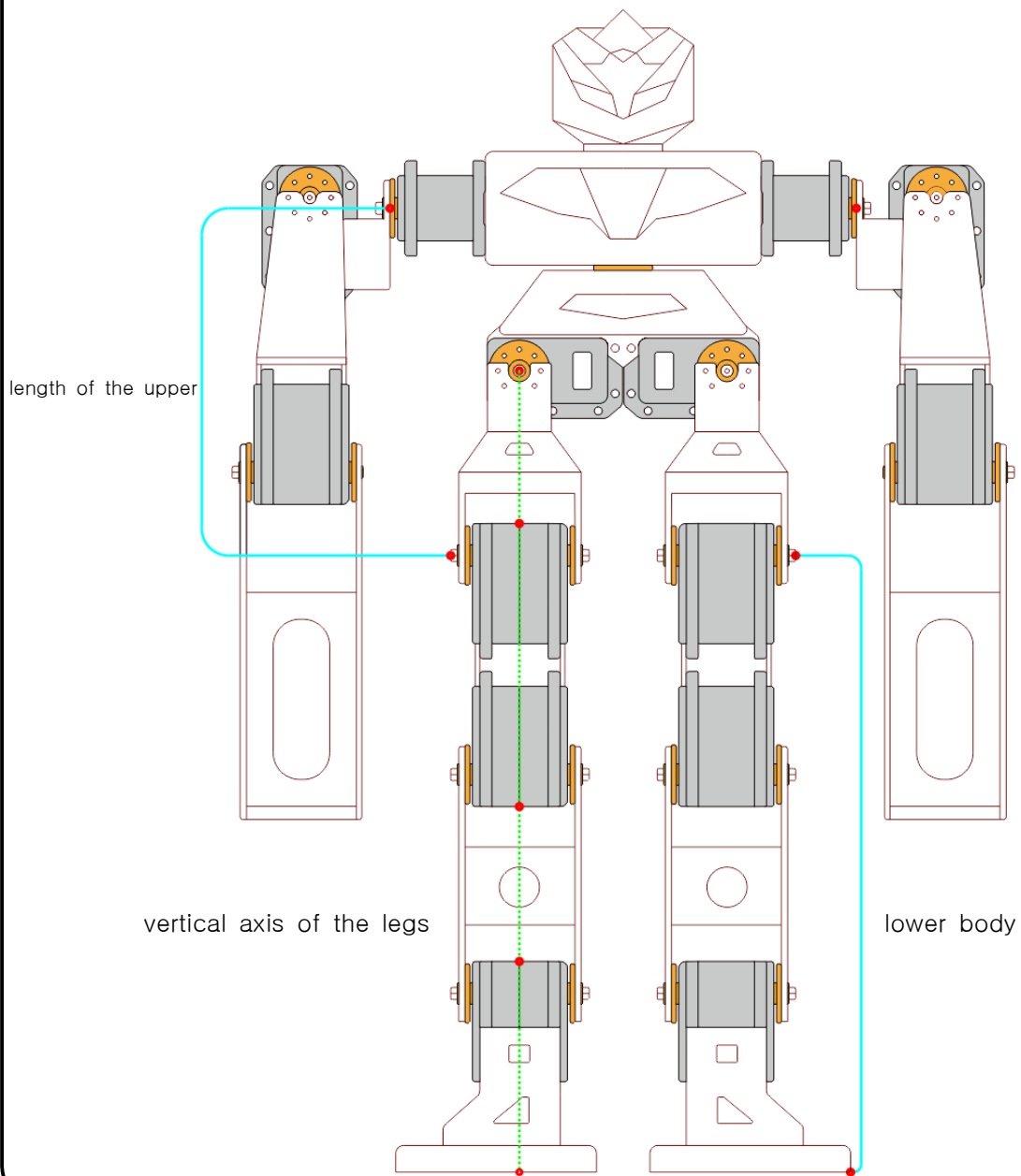
6 height of fingertips, **angle of fingertips**, **width of the arm from the side**



2-3-8. length of the upper body : The length is measured as the straight-line distance from the 'shoulder axis' to the 'front and rear axis' adjacent to the chest.

Class	length of the upper body limit
Minimum	90mm or more
Flyweight	90mm or more
Bantam weight	100mm or more
Feather weight	100mm or more
Light weight	100mm or more
Middle weight	120mm or more
Heavy weight	130mm or more

⑦ length of the upper and lower body, vertical axis of the legs



2-3-9. length of the lower body : The length is measured as the straight-line distance from the 'front and rear axis' adjacent to the upper body to the 'bottom of the foot', and in the case of legs constructed with a linkage structure, it is measured from the 'top front and rear axis' directly connected to the motor to the 'bottom of the foot'.

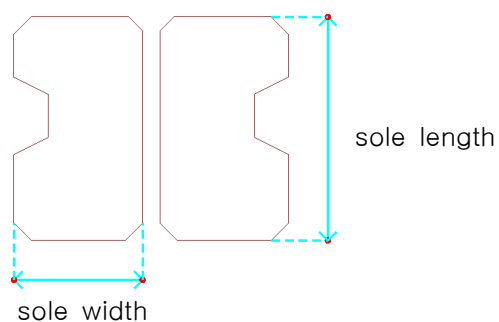
Class	length of the lower body limit	frontal width limit of the legs	lateral width limit of the legs
Minimum	110~140mm	70mm or less	70mm or less
Flyweight	110~140mm	70mm or less	70mm or less
Bantam weight	180~230mm	100mm or less	100mm or less
Feather weight	180~230mm	100mm or less	100mm or less
Light weight	180~230mm	100mm or less	100mm or less
Middle weight	230~270mm	110mm or less	110mm or less
Heavy weight	270~300mm	110mm or less	110mm or less

2-3-10. leg motor position : In the 'specification posture' viewed from the front, all motors of the lower body and the soles of the feet must be positioned along the vertical axis of the pelvic motor center.

2-3-11. size of the sole of the foot : The maximum straight-line length of the horizontal and vertical dimensions of the portion of the foot touching the ground is measured. The sides of the sole should be designed with caution during 'walking', 'attacking', and 'defending' states to ensure they do not touch the ground of the playing field.

Class	sole length limit	sole width limit
Minimum	100mm or less	60mm or less
Flyweight	100mm or less	60mm or less
Bantam weight	105mm or less	65mm or less
Feather weight	105mm or less	65mm or less
Light weight	110mm or less	70mm or less
Middle weight	120mm or less	75mm or less
Heavy weight	130mm or less	80mm or less

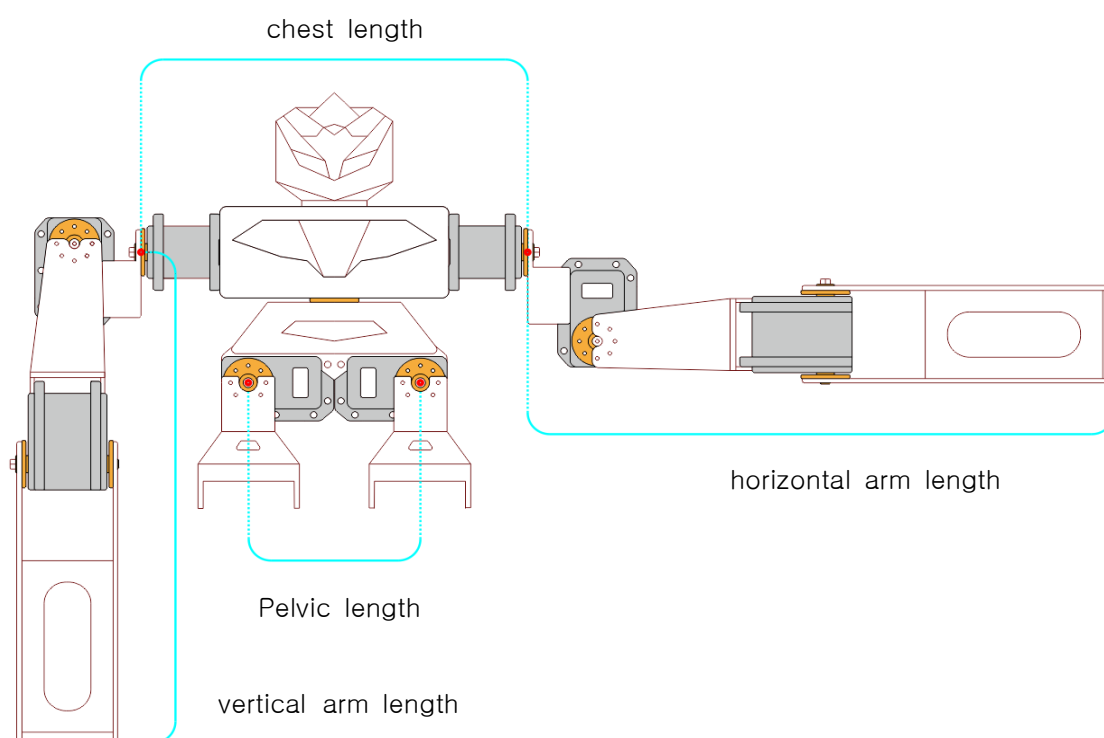
⑧ size of the sole of the foot



2-3-12. pelvic length : The length is measured as the straight-line distance between the 'left and right axes' of the leg adjacent to the upper body.

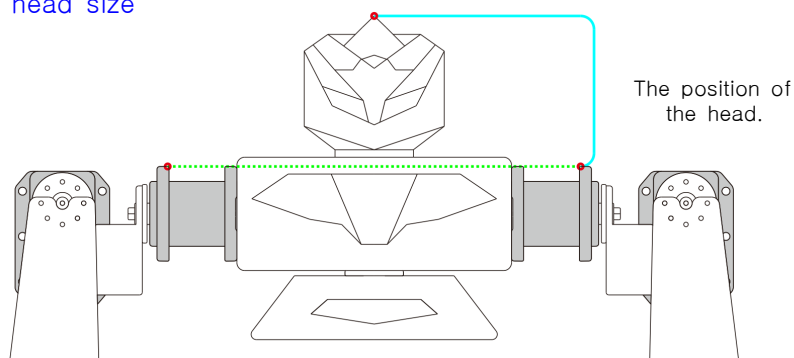
Class	pelvic length limit
Minimum	80mm or more
Flyweight	80mm or more
Bantam weight	90mm or more
Feather weight	90mm or more
Light weight	90mm or more
Middle weight	100mm or more
Heavy weight	100mm or more

9 Pelvic length and vertical & horizontal arm length



2-3-13. head size : The head should be manufactured with dimensions of at least 30 x 30 x 30mm (width x height x depth), and measurements should be taken from the topmost end of the motor located at the chest or shoulder, whichever is higher.

10 head size



~~3-2-9. The position of the arm motor. In the "standard position," with both arms held horizontally, all arm motors must be aligned with the shoulder axis. As shown in Figure 8, all motors must be positioned along the reference line determined by the shoulder axis rotation. No motor should be outside this line. Measurements are taken by rotating the arms 360° around the torso and chest in the "standard position."~~

3-1. Other specifications and manufacturing conditions

3-1-1. The robot is pre-manufactured according to the specified standards and specifications for participation.

3-1-2. If the robot malfunctions before the start of the match and cannot operate, repairs and parts replacement are allowed within 2 minutes, subject to the referee's decision.

3-1-3. The surface of the robot.

- The fingertips of the robot must not use un-anodized components (materials conducting electricity), and must not have sharp or pointed edges that can scratch human skin. Joints in the fingertips or folding joints must be rounded and maintained in a rounded shape throughout the match.

If adhesive materials are used on the fingertips, they must be removable without damaging either the adhesive or the paper when an A4 sheet is attached and removed from the robot.

3-1-4. Other robot restrictions

- Robots with structures including sharp or pointed parts, knives, saw blades, high-speed rotating devices, lasers, electric shocks, adhesive structures, launching mechanisms, or those using water or fire are not allowed to participate. Additionally, robots that cause excessive damage to people, opposing robots, or the arena beyond what is necessary are also prohibited from participating.

3-2. Power specifications

3-2-1. All batteries conforming to internationally recognized safety standards are permissible. However, the use of AC voltage, liquid fuels, and combustion engines is prohibited for safety reasons.

3-2-2. The use of personally assembled or modified batteries, as well as non-commercialized power sources, is prohibited.

3-2-3. For the safety of participants, the use of inflated batteries is strictly prohibited.

3-2-4. The battery must be securely placed in the safest position within the robot's upper body. It should not be located in any part of the robot's lower body, even partially.
Except for battery cables.

3-2-5. The battery installed in the robot must be covered with a 'safety cover' to prevent damage, and the safety cover should be designed for easy removal if necessary.

3-2-6. In case of any issues with the battery installed in the robot, for safety reasons, the robot may be immediately removed from the venue and disposed of, and the participant is responsible for any consequences arising from this action.

3-2-7. When charging and storing batteries, it is mandatory to use a 'Li-Po Guard Safe Bag.'

3-2-8. If separate charging is necessary within the arena, it must be conducted under the supervision of a guardian. Only chargers equipped with a 'balance charging' function may be used, and charging must be done at a slow rate of 1A or below. It is strictly prohibited to charge batteries within the arena or accommodation facilities if these rules are violated.

3-2-9. Battery charging is only permitted at designated locations, and charging on the floor is strictly prohibited. When charging on a desk, it is mandatory to pack the battery in a 'Li-Po Guard Safe Bag' with at least 'two layers' of protection. All participants are strongly advised to wear safety goggles during this process.

3-2-10. Robots that violate the "power specifications" cannot participate.
The participant is responsible for all damages and recovery efforts resulting from failure to comply with all of the above regulations.



3-3. Communication specifications

3-3-1. All wireless communication methods except wired communication are allowed. However, intentional interference with the operation of opponents through communication is strictly prohibited.

4-1. Disqualification regulations

4-1-1. Participating in a match using another participant's robot.

4-1-2. Refusing to comply with referee instructions or decisions.

4-1-3. In case of violations of the 'robot specifications' during the match.

4-1-4. If leaving the arena or designated waiting area without permission from the referee.

4-1-5. If using profanity or engaging in violent behavior.

4-1-6. If engaging in any unsportsmanlike behavior or actions that disrupt the course of the match.

4-1-7. If unable to participate even after all other participants' matches have concluded."

4-1-8. If a participant is disqualified, their performance in the match will not be recognized.

4-1-9. If a team or participant is disqualified or intentionally undermines fairness, the IREA reserves the right to permanently revoke their eligibility to participate in I REA-sanctioned tournaments through a council meeting.

*Please note that the regulations for this competition may be subject to future revisions.
Please check periodically for updates.*

국제로봇교육협의회

President, International Robotics Educational Association



Association Secretariat Confirmation

Secretary General

Junhyeok Jang

Please send your inquiries to this email address: robot-league@naver.com
Or contact the association representative, Daewon LEE, on WhatsApp at +82 1026043782.
Work date: June 15, 2024