



# KRL - Robot Battle

## 1. Description

「Robot Battle」 is a competition that utilizes a variety of materials and a festival to learn each other's technical skills and enjoy the game together with respect. It is a 1:1 or 2:2 tournament match that takes place at a designated stadium. The team that acquires a certain amount of point by pushing the opponent off the stage wins the game. The competition's league will be divided according to the age of the participant and the weight class of the robot.

※ The tournament schedule can be altered depending on the number of participants.

## 2. Participant Classification

### 2-1. League Class

Weight Class	BASIC Class	Pro Class
LIGHTWEIGHT	Age 7 ~ 12	Age 7 ~ Adult
MIDDLEWEIGHT	X	Age 7 ~ Adult
HEAVYWEIGHT	X	Age 7 ~ Adult

### 2-2. Weight Class

Weight Class		Criteria
LIGHTWEIGHT	<b>BASIC</b>	Ready-made robots, weight ≤ 500 g
	<b>Pro</b>	Ready-made or DIY robots, weight ≤ 500 g
MIDDLEWEIGHT	<b>Pro</b>	Ready-made or DIY robots, weight ≤ 700 g
HEAVYWEIGHT	<b>Pro</b>	Ready-made or DIY robots, weight ≤ 1000 g

2-2-1. Excess weight of up to + 3g is allowed.

### 2-3. Ready-made Product Class ※ Please inquire for other ready-made robots

Weight Class	Ready-made Products
LIGHTWEIGHT	probo, roborobo, META, CUBO, KAIROBOT, OLLO, DREAM, Robotry, TRobot, ect
MIDDLEWEIGHT	—

2-3-1. “Ready-made products” can participate at the appropriate weight class regardless of the robot's dimension. ‘Ready-made products’ should have all of the components at the initial state. The use of components from several “Ready-made products” are prohibited; only components from a single product is allowed. However, batteries, battery cases, cables, communication modules, and decorations pieces from other products

that does not affect the performance can be used. If any other parts that are not listed above is combined or arbitrarily modified or processed, the robot will be subjected to the DIY category and can only be modified within the Robot Standard policy.

### 3. Robot Standards

#### 3-1. Build Regulation

- All participants should have their robot assembled ahead of the competition, and only robots that passes the “Robot Standard“ policy, which is measured before the game, are qualified to utilize.

#### 3-2. Robot Standards

3-2-1. Overall Size : Measure the maximum operation range in a straight line.

Weight Class	Size Limitation (Width x Length x Height)	
<b>LIGHTWEIGHT</b>	<b>BASIC</b>	under 20 x 20 x 20cm
	<b>Pro</b>	under 25 x 25 x 25cm
<b>MIDDLEWEIGHT</b>	<b>Pro</b>	under 30 x 30 x 30cm
<b>HEAVYWEIGHT</b>	<b>Pro</b>	under 40 x 40 x 40cm

3-2-2. Defense Structure : The parts that touches the floor of the stadium, except for the “wheels“ of the robot, is called the “defense structure“. Among the four sides (front, rear, left and right), only one sides is available to utilize as the “Defense Structure“.

- All of the parts except for the “wheels” and the “Defense Structure” should be kept afloat from the stadium floor.

3-2-3. Defense Structure Size : Measure the maximum width that touches the floor in a straight line.

Weight Class	Size Limitation	
<b>LIGHTWEIGHT</b>	<b>BASIC</b>	width ≤ 20cm
	<b>Pro</b>	width ≤ 25cm
<b>MIDDLEWEIGHT</b>	<b>Pro</b>	width ≤ 30cm
<b>HEAVYWEIGHT</b>	<b>Pro</b>	width ≤ 40cm

3-3-4. The use of Defense Structure that can change during the game, such as a ‘lift structure’, are permitted.

**※ In case of special structures, please inquire by mail with a photo attached.**

#### 3-3. Other Regulations and Assembly Conditions

3-3-1. Participants should assemble their robots ahead of the competition.

3-3-2. In the event in which the robot malfunctions before the match, the participant is given ‘two minutes’ of time to replace and fix the parts depending on the referee’s judgment.

### **3-3-3. Surface Treatment Regulation**

- For the surface of the robot, it is prohibited to use materials that are not anodized (e.g. conductive materials, ect), there should be no parts which are sharp enough or pointed that may lead to injuries. The surface or the folding sections of the joints should be made round and its form should be kept during the entire match.

If adhesion material is used on the surface of the robot, including the tires, the use is permitted only in the case when the A4 paper, which will be attached and removed from the adhesive part, is not damaged or when there is no residual substances left on the paper.

### **3-3-4. Other Robot Restrictions**

- Except for metal bolts that are used for fastening, it is prohibited from using metal parts for the robot's outer shell. However, for the "LIGHTWEIGHT BASIC" weight class, only metal parts that's included in the "ready-made product" are allowed to use, in case the parts are not arbitrarily machined.
- Robots that use structures that include sharp or pointed structures, knives, saw blades, high-speed rotation devices, lasers, electric shock devices, adhesion structures, launch mechanisms or utilizes liquid or flame cannot participate. In addition, robots that can give excessive damage to people, instruments, and stadiums are not allowed to participate.

## **3-4. Wireless Standards**

**3-4-1.** All wireless communications are allowed, except wired-communication

- IR(Infrared), Bluetooth, RF communications, and RC are all available. For the chance of radio interference, participants should set use the frequency range apart from the frequency the opponent team is using.
- The participant is responsible for the malfunction due to multiple frequency interference. However, the use of wireless communications may be prohibited if it intentionally interferes with the opponents operation.

## **3-5. Power Regulations**

**3-5-1.** Batteries that are on the market, and are guaranteed of safety is allowed. However, the use of AC voltage, liquid fuel and combustion engine is not permitted in consideration of safety.

- In the consideration of "safety" and "performance", participants in the "BASIC" weight class is to use only FOUR "alkaline" batteries of "AA or AAA size" with a total voltage of 6V or less. Even if the robot that is a ready-made product does not utilize alkaline battery, the power module should be replaced according to the power standard for participation.

Weight Class		Criteria
<b>LIGHTWEIGHT</b>	<b>BASIC</b>	under 6V, under four AA or AAA size alkaline battery
	<b>Pro</b>	under 11.7 V, no limitations in battery type
<b>MIDDLEWEIGHT</b>	<b>Pro</b>	under 11.7 V, no limitations in battery type
<b>HEAVYWEIGHT</b>	<b>Pro</b>	under 11.7 V, no limitations in battery type

- 3-5-2. Other than batteries commercially available, self-assembled and refurbished batteries are not allowed.
- 3-5-3. For the safety of the participants, the use of bloated batteries are prohibited.
- 3-5-4. If a participant requires to charge its batteries at the stadium, only chargers equipped with “Balance Charge” function are allowed for use. Chargers that does not meet with this standards cannot be used within the stadium.
- 3-5-5. When charging or storing batteries, all participants should place it inside a Li-Po guard safe bag.
- 3-5-6. The battery must be placed in the safest place inside the robot.
- 3-5-7. Batteries mounted on the robot should be covered with a “safety cover” in case of damage, and the “safety cover“ should be made to be easy removed in case of emergency.
- 3-5-8. If there is a problem with the battery installed in the robot, the robot can be immediately taken out and discarded for safety. All responsibilities rests with the participant for the case above.
- 3-5-9. Charging batteries is only allowed in designated places, and all participants should never charge batteries on the floor. When charging on the desk, make sure to double pack the “Li-Po Guard Safe Bag” before charging. If possible, all participants are strongly recommended to wear safety goggles in the event of charging batteries.



### 3-6. Motor Regulations

#### 3-6-1. Motor Torque Limitations

※ Please inquire for other types of motors

Weight Class	Size Limitation (Width x Length x Height)	
LIGHTWEIGHT	BASIC	Less than 2 D.C motors and less than 1 servo motor in 'off-the-shelf products'
	Pro	no limitations
MIDDLEWEIGHT	Pro	no limitations
HEAVYWEIGHT	Pro	no limitations

### 3-7. Robot Standards Evaluation Process

3-7-1. All robots participating in the competition must complete the “standards evaluation” within the specified time. Participants that fail to meet the standards will be disqualified according to the regulations.

3-7-2. If a robot needs to be modified or corrected after the 'standards evaluation', it should be re-evaluated after the modification within the specified time. Failure to do so will result in disqualification.

3-7-3. For quick and accurate evaluation, during the “standards evaluation”, power should be applied and the “standard posture” must be taken in a fixed state. At this time, the participant is responsible for the numerical error that occurs when the robot is not fixed. Bring a remote controller if necessary.

## 4. Match Regulations

### 4-1. Competition Method

4-1-1. The participant who obtains the greater “Down Point” within “one minute” wins by decision.

4-1-2. Participants require two “Down Points” in the “BASIC” class, and three “Down Points” in the “PRO” class for a “TKO win” declaration and the match ends immediately.

4-1-3. In cases where participants can't manipulate their robots within “5 counts” after declared a “Standing Down”, a “KO defeat” is declared the match ends immediately. However, in the case of a “Pair” match, the match will be proceeded without declaring a “Standing Down”.

4-1-4. In the case of “Disqualification” or “Absence”, the match ends immediately, and the corresponding player is declared as defeat.

### 4-2. Down Regulations

4-2-1. **The absolute authority of the judgment and standards of a Down declaration lies to the referee.**

4-2-2. If the opposing team's robot is pushed out of the stadium, two “Down score” is obtained. In case both team's robot fall off the field together, only the team that posed the attack acquires the score. In cases where the opposing team's robot is thrown out of the field by suppression or lift up, the team that posed the attack acquires the score.

- 4-2-3. In case the opponent's "target" is thrown off the field, one "Down" point is acquired.
- 4-2-4. Each participant's "First Warning" is addressed with a verbal warning, followed by one "Down" for every "accumulate" warnings afterwards.
- 4-2-5 If the referee determines that both teams have scored at the same time and have completed the game, the team that scored the first down wins.

#### **4-3. Slip Down Regulations**

- 4-3-1. All parts except for the robot's "wheel" or "one side of the defense structure" must not touch the floor of the stadium. If violated, "Slip-Down" is declared and in cases of intentional slip-downs, a "warning" will be imposed.
- 4-3-2. If the robot is determined to have a "slip-down structure" during the match, "two minutes" of fixing time is given and for every "excess of two minutes", the participant will be marked with one "down". If it is not possible to fix according to the regulation, the corresponding participant will be disqualified by article 4-3.

#### **4-4. Ring Out Regulations**

- 4-4-1. In cases where the participant's robot falls off the stadium, a "Ring Out" is declared and the opposing team acquires a score of two "Down" points.
- 4-4-2. If all of the robots from both teams are in a state of "Ring Out" before the match ends, the robots are repositioned to the start position and the match is resumed. If only a few robots are in a state of "Ring Out", then the game will continue without stopping.

#### **4-5. Time-out Regulations**

- 4-5-1. During the match, the competitor may request a "time-out" from the referee in the event of a rule violation or robot malfunctions. "Two minutes" will be given for all participants and in cases when a participant exceeds the time limit, one "Down" is declared for every excessive "two minutes"
- 4-5-2. 'Time-out' requests made due to objections or for making critical suggestions during the competition will not be declared as one "Down". However, a "warning" is imposed if it is not accepted as a reasonable "Time-out" by the referees' judgment.

#### **4-6. Standing Down Regulations**

- 4-6-1. If the robot has no movement for more than 5 seconds, the referee can declare a "Standing Down." "Standing Down" is handled as one "Down" and after the declaration, if the user fails to move within "five counts", then a "KO" defeat is declared.
- 4-6-2. For some exceptional cases, even if a robot is unable to move or is overturned, a "Standing Down" will not be declared and the game will continue at the discretion of the referee.

#### **4-7. Attack Regulations**

- 4-7-1. “Push”, “Grab”, “Pull”, “Lift”, “Flip”, ect are possible as an action of attack.  
- “Rotational” or “Drum” type weapons or parts are prohibited for use.  
All robots that violate this article will be immediately “Disqualified”.

#### **4-8. Driving Regulations**

- 4-8-1. It is not allowed to drive with any other parts except for the “wheels” and “one side of the defense structure”. In case of violation, “two minutes” of correction time is given and one “Down” is declared. Not possible to modify according to the regulations will lead to a disqualification of the corresponding participant.
- 4-8-2. Driving should be possible for at least “two” directions among four possible directions for driving (front, rear, left, right). The referee may request for confirmation at any time prior to or during the match. Robots that fail the test requested will be disqualified for violating driving regulations.

#### **4-9. Other Regulations**

- 4-9-1. At the beginning of the match, or after the match is resumed after a “Down” is declared, all robots are to be positioned at the start position. The start distance between the robots should be at least 50 cm apart. In case a participant intentionally violates this article are imposed a “Warning” from the referee. However, the weight class below ‘BASIC’ shall be 20 cm.
- 4-9-2. During the match, if the battery of the robot falls apart from the body, the match will be suspended immediately. Afterwards, the corresponding participant is given “two minutes” of repair time and a “Down” will be marked. If the repair is not possible, a “TKO defeat” will be declared.
- 4-9-3. During the match, the robot cannot be touched without the permission of the referee. Participants that fail to do so will be imposed a “Down”.
- 4-9-4. If a defensive game is played, the referee can impose a “warning”.
- 4-9-5. In case of a “stop” sign from the referee during the match, both participants should stop their robots immediately. Violation of this article may result in a “warning”.
- 4-9-6. If all the robots from both of the teams are tangled to each other and the match cannot proceed, the referee can “suspend” the match then resume at the “start point” of the stadium.
- 4-9-7. If an error or misjudgment is made by the referee, a rematch may be proceeded during the match or even after the match has finished.
- 4-9-8. If the competitor or their parties does not comply with the referee’s decision, or give a remonstrance with an impolite manner, a “warning” will be given. If this is repeated even after the warning, the corresponding participant will be immediately disqualified.
- 4-9-9. In the event when a referee explains about the decision or rule, during the match or while the match is suspended, participants are required to reply “Yes” with a “nod” as a means of understanding the decision or rule.

#### 4-10. Term Regulations

4-10-1. While the match, terms as ‘레디:Ready’, ‘파이트:Fight’, ‘다운:Down’, ‘노카운트:No-Count’, ‘스탠딩다운:Standing-down’, ‘링아웃:Ring-out’, ‘토크오프:Torque-Off’, ‘떨어져:Tteol-eo-jyeo(Distance)’, ‘경고:Yellow-Card’, ‘타임:Time’, ‘스톱(중지):Stop’, ‘그만:Geu-man(Game-Over)’, ‘승:Seung(Win)’, ‘차렷:Cha-lyeos(Attention)’, ‘인사:In-sa(Bow)’ ect will be used. All participants should be familiar with the terms that will be used according to the situation.

4-11. **Other matters not presented shall be decided upon consultation with the Referee Committee on the same day.**

### 5. Robot Modification

5-1-1. In the event when a robot needs to be modified after the “Standards Inspection” due to the abnormal conditions of the robot, it must be approved by the referee before it can be modified. (One “Down” will be marked, if needed to be modified during the match.)

If a participant changes the robot arbitrarily without permission, the corresponding participant will be “disqualified”.

### 6. Evaluation Method

#### 6-1. Basic Evaluation

6-1-1. The participant who attains a declaration of “KO”, “TKO” or “win by decision”, disqualification or withdrawal of the opposing team shall win the match.

6-1-2. Depending on the situation, multiple robots may be put in a “rumble” match as a “Rank Determination Match”. In a “rumble” match, it is possible to pose an attack towards a fallen robot, and when other participant’s robots are declared “Ring Out” or a “Down”, then the robot last standing on the field wins.

#### 6-2. Tie Regulations

6-2-1. If both teams score the same points and end the match tied, the team that wins an extra “point” during the overtime will win the match.

6-2-2. In the case of tie, no repair time will be given and both participants immediately start an overtime match of “one minute”. The team that wins an extra “point” will win the match.

**In the event of an overtime match, the “warning” received from the official match shall be carried forward to the overtime match.**

6-2-3. In the case of tie even after the overtime match, the match will be evaluated by the following priority:

- Evaluation Priority : Team with the least warning at the overtime match > Team with the least overall weight of the robots > Team with the least sum of age

#### 6-3. Disqualification Regulations

6-3-1. Rejection to the referee’s instruction or decision.

6-3-2. In case of violation of the “Robot Standards” during the match.

6-3-3. If robots that are not of your possession is tampered, or interference of



the match.

**6-3-4.** If you leave the stadium or the designated waiting area without the permission of the referee.

**6-3-5.** In case of verbal abuse or conflict among participants.

**6-3-6.** Participating a match with a robot that is used by another participant in the same competition.

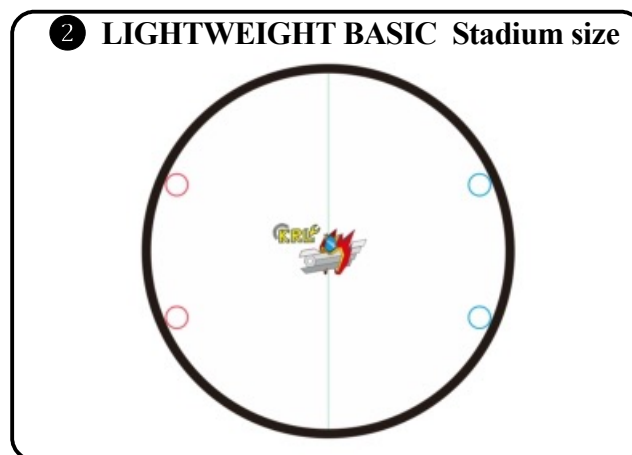
**6-3-7.** Cases when other participants suffer loss due to cheating or actions passing the bounds of common sense.

## 7. Stadium Regulations

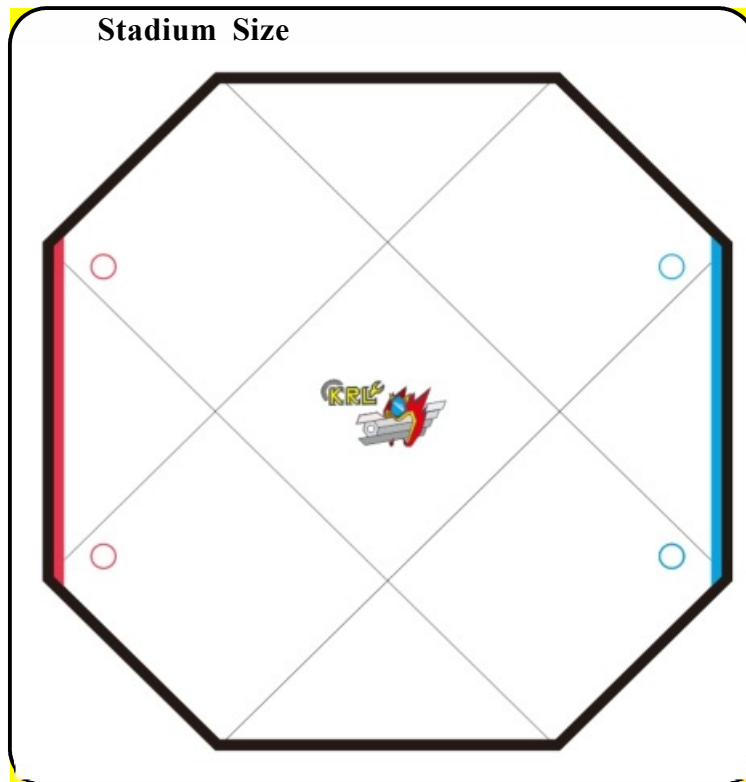
**7-1. Stadium structure** – This is an example and may change depending on the situation on the day of the competition.

### 7-1-1. Stadium size

- **LIGHTWEIGHT BASIC stadium size is 120 x 20 cm (Diameter x Height).** (Error Range of  $\pm 5\%$ ) stadium floor material is PET.



- The stadium size of all weight classes, other than LIGHTWEIGHT BASIC, is **198 x 198 x 30cm (Width x Length x Height).** (Error Range of  $\pm 5\%$ ) **70 x 70 cm,** the stadium will be made with five 22T square plastic-coated laminated wood size of 70 x 70 cm, four 22T right-angled triangle and the stadium floor material is PET.



### 7-1-2. Target Size

- The target area is a circle of 8 cm in diameter and is located on the edge of the stadium.
- The target is a rubber cone the size of 8 cm x 8.5 cm (diameter x height) and weighs 15 g.
- The target (red/blue cone) is located within the target area, and the number of targets will be disclosed at the competition venue on the day of competition. (One or two targets are assigned per team)



### 7-1-3. Start position of the Robot

- The robot's start position is located between the targets.

## 8. Other

### 8-1. Event Match

8-1-1. If all competitions have been finished ahead of schedule, all competitors

may compete in a "rumble" match and other events.

- The rules of this game may be modified in the future. Please check from time to time.
- ✖ Other inquiries: robot-league@naver.com

**\* The rules of the competition may be updated later. It is strongly recommended to regularly check the updated rule book. \***

