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# **Sony Four Legged Robot Football League Rule Book**

(Draft on 12/01/2000)

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## Rules are classified into several categories

1. Setup of the environment
2. Robot Players
3. Game process
4. Forbidden action of robots and penalties
5. Judgement

### 1. Setup of the environment

#### 1-1. Field Size

Dimension of Football field is described in Figure 1-1(Field Size).

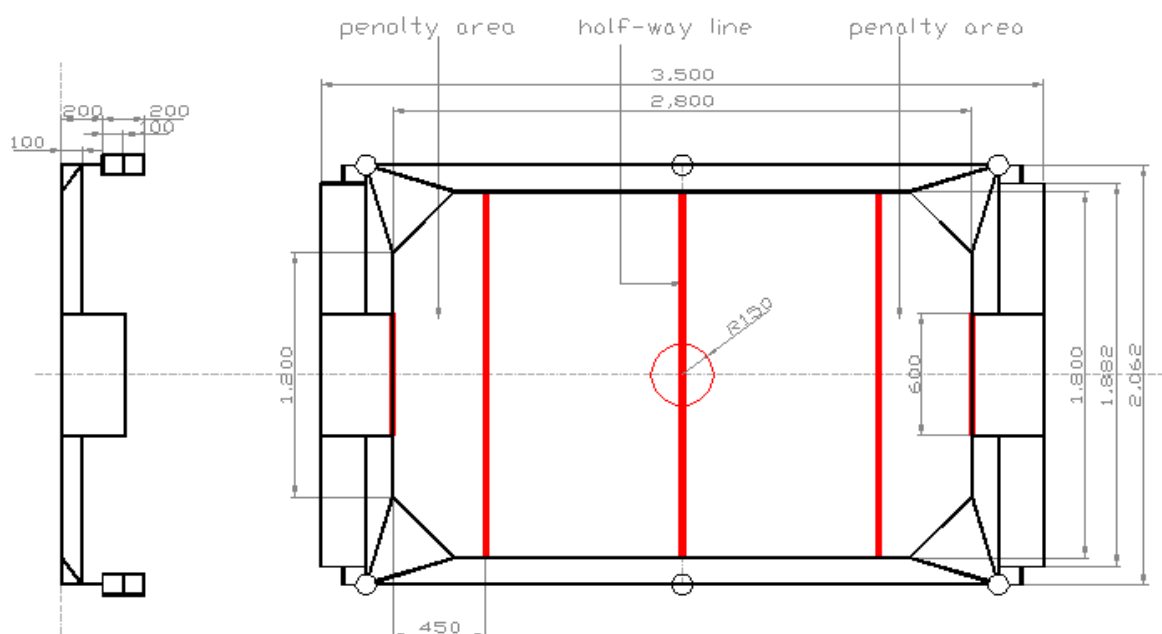


Figure 1-1(Field Size)

#### 1-2. Field Color

Color of Football field is shown in Figure 1-2(Field Color).  
Additionally, please refer to "Colors used in the Football Field" on the web.

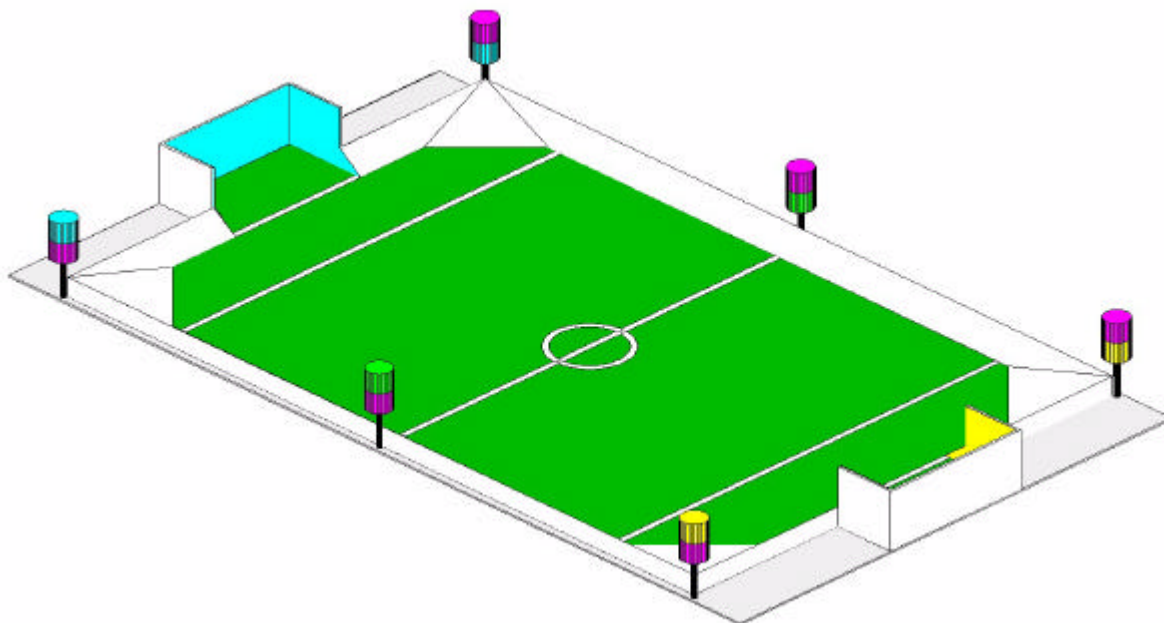


Figure 1-2(Field Color)

### 1-3. The results of spectrum

The results of spectrum of the color samples measured is on the web.  
Please refer to "Spectrum of the colors samples".  
Note : The lighting condition in the actual competition site will be different.

### 1-4. The Lighting Condition

This will be notified separately.

### 1-5. White line

All white line (the center line, center circle, penalty line and goal line) on the soccer field is drawn using vinyle tape with the width of 25mm.

## 2. Robot Players

Please refer to a brief introduction of Sony Quadruped Robot described in a separate file.

### 2-1. Teams

One team should consist of 3 robots including a goal keeper.

### 2-2. Goal Keeper

Goal keeper is the only player who is allowed to stay within penalty area of its own team. Goal keeper should be settled and marked to identify other players.

### 2-3. Size and Shape

It is described in a separate file as well.

### 2-4. Body color

Hardware of the robot should remain intact as when it was provided you.

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For distinction purpose, the team markers will be provided, so it has to be attached to the robot. (Refer to Team Markers on the web.)

## **2-5. Ball handling mechanism**

The robot players may exert force onto the ball only by direct physical contact with one of their body parts.

Refer to "4-1. Ball Holding".

## **2-6. Communications**

There are no restrictions on communication between the robots using a microphone or a speaker.

The use of remote computer is prohibited.

## **2-7. Global Vision System**

Global vision system is prohibited.

## **2-8. Sensing System**

Any other sensors than originally installed to the current robots are not allowed.

# **3. Game process**

## **3-1. Length of the game**

One game consists of three parts, the first half, break and the second half. Each half is 10 minutes. The break is also 10 minutes.

In case the game is draw, this year no extension game will be played. But, instead, there will be a penalty kick match employing sudden death.

The referee can adjust (extend/shorten) this period depending on the situation.

A court change and uniform change will occur in the break.

## **3-2. Winner**

The team marked more goals than the other is a winner of the match. If two teams marked same score, the game will be a draw. The draw will follow the same system defined above 3-1. Total (and final) standings will be decided on points as follows; (the points will be given based on the result of each game.)

WIN = 3 pts. LOSS = 0 pts

WIN = 2 pts. LOSS = 1pts (for the penalty kick)

## **3-3. Start-up**

A game (or a robot) will be started in a manual setting.

## **3-4. Kick-off/Restart/Stop**

For kick-off, restart, and stop of the game, the referee will call verbally, or by a whistle, and the operator of the game can relocate the robot by his/her own hand, and do Start-up.

## **3-5. Robot positions**

Definition of where the robot positions, as a principle, is set forth when its three legs set inside the same area, in the case the robot is defined as it is in such area. For instance, the definition where a goalkeeper is in penalty area, is deemed as the robot is in the penalty area during his three legs are in the area.

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### 3-5-1. Kick-off

All robots shall be located in their side of the field. One robot, which kicks the ball, must set its front feet on the center circle. Goalkeeper shall keep inside of penalty area, the others must set their hind feet on the penalty line.

The attacking team must place their players first, and then the defensive team can place their players.

Robots shall be started in hitting their head-pad. Any robots may not move their legs before whistling. Goals are not allowed to be scored on the kickoff. It is required that another player touch the ball before a goal can be scored. The restart after the goal shall adopt the same formation as the kick-off.

### 3-5-2. Free Kick

None.

### 3-5-3. Penalty Kick

Penalty Kick will be carried out in either way of 2 choices below.

#### 1. Penalty kick without a goal keeper

It is allowed to switch to the program which is specially designed for Penalty Kick. Both the kicker and the ball are placed at a specific place on the field, and the kicker is given a chance to make a goal within a specific period of time.

#### 2. Penalty kick with a goal keeper

This type of penalty kick is defined as one-on-one confrontation between the goal keeper of the defending team and a kicker chosen by the opposition team. The remaining robots must remain outside the penalty area.

The kicker will kick the ball from the middle between the goal line and halfway line. You can put the goal keeper wherever you like, but it is not allowed to move and has to remain to be a standing position.

In other words, the power of the keeper should be OFF during the penalty kick.

### 3-5-4. Throw-in

None.

When the ball goes out of bounds, it shall be replaced inside of the field where it goes out.

### 3-6. Forbidden actions

Forbidden actions are defined in the section "4. Forbidden action of robots and penalties".

### 3-7. Game stuck

In the event of no substantial change in the game state (as shown in "Figure 1-3(Stuck)") for 30 seconds, the referee shall pick up the robots which are jamming around the ball and move to the half way line (The referee does NOT replace the ball).

If no robot seems to be heading for the ball for 30 seconds, referee shall stop the game and restart the game from the kick-off formation. (Ball control side will be exchanged.)

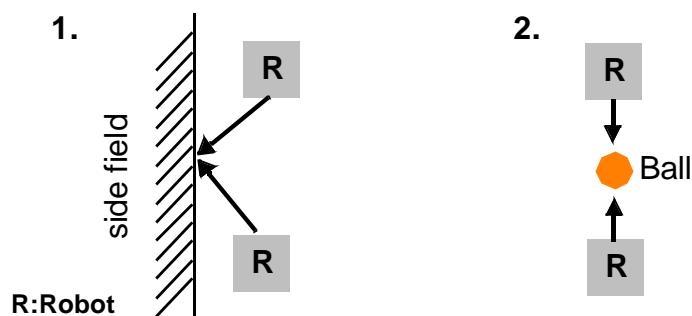


Figure 1-3(Stuck)

### 3-8. Manual Interaction by Team Members

Manual interaction with the robots, either directly or via some communications mechanism, is not permitted except during kick-off, restart, and finish of the game or when ordered by referee.

Either team may request that one of their players be picked up only for hardware dysfunction at any point in the game. (called **“Request for Pick-up”**) It is permitted to change batteries, fix mechanical problem or, if necessary, reboot the robots, but not to change or adjust their program. Any strategic Request for Pick up is not allowed.

The robot will be replaced on the half way line after 30 seconds.

## 4. Forbidden action of robots and penalties

Following actions are forbidden. In general, when penalty applies, the robot should be replaced, not the ball.

### 4-1. Ball Holding

Ball holding more than 3 seconds is not allowed. Any robot can hold the ball for up to 3 seconds, but is not allowed to move with it.

Holding a ball means taking a full control of the ball by removing its entire degrees of freedom; typically, fixing a ball to the body or surrounding a ball using the body to prevent accesses by others.

It is important that another robot can easily take possession of the ball when a robot controls the ball.

Refer also "2-5. Ball handling mechanism".

This action will result in having the robot which held a ball outside of the field for 30 seconds and it should be back to the field from half-way line 30 seconds later.

#### 4-1-1. Advantages of Goal keeper

Goal keeper can hold the ball for up to 5 seconds as long as he has at least two legs in the penalty area. If a goalkeeper accidentally gets into a situation where it holds the ball for 5 seconds, the ball shall be removed from its possession and placed on the penalty area at the nearest place to where the foul occurred.

While goalkeeper holds the ball (5 seconds), attacker cannot touch it. If any attacker violates this goalkeeper advantage, the robot will be ordered to be outside of the field for 60 seconds.

### 4-2. Damage to the field/robots/ball

A robot that damages the field and/or other robots will be removed from the field for the remainder of the game.

Similarly a robot that poses a threat to spectator safety.

In such a case, penalty kick will be employed.

### 4-3. Prohibited Defence

For defense purpose, only one robot can stay in the penalty area as a keeper. “In the penalty area “ is defined that two or more feet are set beyond the penalty line. (Called “**Two Defenders Rule**”)

Make sure that projection of the polygon which consists of the contact points of the robot to ground to the goal is less than 50% of the length of the goal line.

The robot which commits this action will be ordered to be outside of the field for 0 second, namely he will be replaced and returned from halfway line 0 second later.

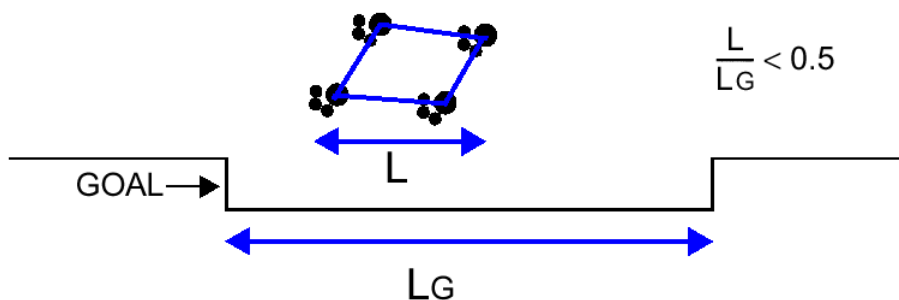


Figure 1-4(Prohibited Defence)

### 4-4. Obstruction

When two or more robots contact with each other, in case

- + among the same team players: Not intermediated
- the situation continues for 30 seconds or over, they shall be ordered to be outside of the field for 30 seconds, then they shall be replaced on the half-way line.
- + among the both team players :
  - anytime the robot which is not heading for the ball (Robot A) makes a contact with other robot which is in the process of heading for it (Robot B)
  - Robot A will be replaced on the halfway line.

In case Robot A is a goalkeeper, this rule shall not be applied.

- All of robots twining are NOT heading for the ball and the situation continues for 30 seconds, they shall be ordered to be outside of the field for 30 seconds, and they shall be once replaced on the half-way line.
- All of them are heading for the ball and stuck situation continues for 30 seconds, Game Stuck rule shall be applied.

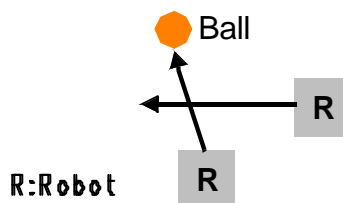


Figure 1-5(Obstruction)

### 4-5. Jamming

During the match any robot shall never jam communication and sensor system of opponents.

The usage of equipments which may cause interference of communication or sensors should be negotiated between two teams before the match.

## **5. Judgement**

### **5-1. Selection of the referee**

Referees are decided by Sony Legged Robot Committee.

### **5-2. Referees during the match**

Referees are chosen from other teams than the two who compete at that time.

We established where you can contact for any questions regarding the Rule.  
Here is the e-mail address for that : [openr-robocup@pdp.crl.sony.co.jp](mailto:openr-robocup@pdp.crl.sony.co.jp)