

FIRA KheperaSot Game Rules

(Approved by the FIRA Executive Committee)

Law 1 : The Field and the Ball

(a) Playground dimensions

The playing field is 1050 mm long and 680 mm wide, with cut-off corners to avoid the ball getting cornered. The cut-off is along a diagonal line that intersects the borderlines at 50 mm from the corners. The playing field is enclosed by 200 mm high walls.

The playing field has a smooth wooden surface painted with non-gloss (non-reflective) green paint. The walls of the playing field are painted grey (non-gloss).

(b) Markings on the playground

The only required marking on the playing field are the centre line and centre of field markings. Other markings only have aesthetic significance and are thus optional. The markings described below are an example. Other markings consistent with markings of real soccer field are allowed. The playing field dimensions and markings are as shown in Appendix 1.

Markings on the field are white lines 5 mm wide. There are the following markings:

A centre line perpendicular to the long sides of the field dividing the field in two halves.

A 10 mm diameter filled circle in the centre of the field.

A centre circle with a radius of 300 mm.

Goal border lines on the sides and the front of an area 300 mm wide and 100 mm deep in front of each goal opening.

The free ball (Law 13) robot positions (circles) shall be marked in grey colour.

(c) The goal

The goals are 300 mm wide and 150 mm high openings in the centres of the walls on the short sides of the field. The goal space is a volume 70 mm deep provided by a box attached behind the goal opening. The inside walls of the goal are painted in non-reflective black.

The goal areas shall comprise of areas contained by the rectangle (sized 70cm X 15cm in front of the goal) and the attached arc (20cm in parallel to the goal line and 5cm perpendicular to it).

(d) The ball

A white or yellow tennis ball.

(e) The field location

The field shall be indoors.

(f) The lighting condition

Bright, uniform, incandescent (e.g. 2 x 500W halogen) lighting reflected from above, centre.

Law 2 : The Players

The players are fully autonomous robots with a vertical cylindrical shape. Although KheperaSot is primarily intended for Khepera robots other similar robots are allowed as long as their diameter does not exceed 60 mm. During the match the robots are not allowed to communicate with an operator or external computer. It is expected that each robot has an on board vision system. To allow the utilisation of the K213 vision turret players must have a vertical cylindrical dress with vertical, equal-width black and white stripes (eight black, eight white). The dress should include a hole for the camera in a black stripe. The two competitors should be distinguishable from above (different colours) and the forward direction of each robot must be indicated by a pointer on the top of the robot.

Law 3: The Match

(a) The teams

A match shall be played between two teams, each consisting of one robot player and up two human team members. The human team members will be allowed place their robot on the field at the position indicated by the referee before each round, start their robot when indicated by the referee and remove the robot from the field at conclusion of the match.

(b) Game duration

A match consist of five rounds of maximum four minutes each. A round ends when a goal is scored or when the ball does not move for thirty seconds. Ties will be decided on penalty shoot-

out (see below).

(c) Time-out and substitutions

Once the match has started neither time outs nor substitutions will be allowed, even in the case of robot failure.

Law 4 : Game Commencement

At the beginning of a round the ball is to be placed at the centre of the field. The players will be positioned differently at the start of each round. The referee will point out 180-degree rotation symmetric starting positions. Each player starts facing the opponent's goal line. In other words a starting position on the opponents half is possible. The referee blows the whistle, and each team is allowed to start their robot. The robots are not allowed to be touched once they have been placed in the field. Thus the robots must be able to perceive a start signal through their sensors, for example by activating a rear-end IR-sensor (Khepera robot).

Law 5 : Method of Scoring

(a) The Winner

A team scores a goal when at least half the ball is inside the goal of the opponent team. The team that scores the largest number of goal is declared the winner.

(b) The Tiebreaker

In the event of a tie after the fifth round, the winner will be decided by the sudden death scheme. Additional rounds are played until a goal is scored. The team scoring the goal is declared the winner.

Appendix 1

