

FIRA MiroSot Game Rules

For Middle League and Large League

1 Setting Up The Game

1.1 The Field ([Appendix A](#))

1.1.1 Playground Surface and Dimension

A black (non-reflective) flat and hard rectangular playground 220 cm x 180 cm (Middle League) or 400 x 280 cm (Large League) in size with 5 cm high and 2.5 cm thick white side-walls will be used. The playground is considered flat if a ball placed anywhere on the field does not start to roll. There should be no edges (such as through tape markings or gaps) on the playground. The topsides of the side-walls should be black in color with the interior walls painted in white (side view).

Solid 7 cm x 7 cm isosceles triangles are to be fixed at the four corners of the playground to avoid the ball getting cornered.

The surface texture of the board should be like a ping pong table. It should provide sufficient grip.

1.1.2 Markings On The Playground

The field of play should be marked as shown in [Appendix A](#). The center circle will have a radius of 25 (Middle League) or 75 cm (Large League).

All lines and marks should be white in color and 3 mm thick.

(Middle League only)

The arc will be 25 cm along the goal line and 5 cm perpendicular to it.

(Large League only)

The arc will be the part of the circle – with radius 20 cm and center 50 cm away from the center of the goal – that is outside of the penalty area.

1.1.3 The Goal

The goal is 40 (Middle League) or 60 cm (Large League) wide. There are no posts or nets at the goal.

1.1.4 The Goal Line And Goal Area

The goal line is the line just in front of the goal. The goal areas (Region A of [Appendix A](#)) are comprised of the area contained by the rectangle (sized 50 cm x 15 cm (Middle League) or 80 cm x 25 cm (Large League) in front of the goal) and the goal itself.

1.1.5 The Penalty Area

The penalty areas (The region B of [Appendix A](#)) are comprised of the area contained by the rectangle (sized 80 cm x 35 cm (Middle League) or 120 cm x 60 cm (Large League) in front of the goal). The penalty area contains the goal area. The arc is not part of the penalty area.

1.1.6 The Ball

An orange golf ball shall be used as the ball, with 42.7 mm diameter and 46 g weight.

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1.1.7 The Field Location

The field should be indoors.

1.2 Vision And Lighting

1. The lighting conditions should be more than 500 Lux anywhere on the playground. The lighting should be diffuse and evenly distributed. A flicker free lighting is recommended.
2. In order to identify the robots and the ball on the playground, a vision system can be used. In Middle League, only one camera per team may be used. This limit does not apply to Large League.
3. In case only one camera is used, the location of a team's camera or sensor system should be restricted to over and above their own half of the field including the center line, so that the camera need not be moved after the side change at halftime. If both teams wish to keep their cameras over and above the center circle of the playground, they shall be placed side by side, equidistant from the centerline and as close to each other as possible. The location of the overhead camera or sensor system should be at a height of 2.5 m (Middle League) or 3 m (Large League).
4. In case a team uses more than one camera the team should inform the organizers about the mounting position and height of the camera to prepare the camera fixture.

2 The Teams

2.1 The Overall System ([Appendix B](#))

A match is played by two teams, each consisting of 5 (Middle League) or 11 (Large League) robots. One of the robots can be the goalkeeper (see [Rule 2.2.2](#)).

Three human team members are allowed on stage. Only one designated team member is allowed to access the playground during a game (if instructed so by the referee), except during timeouts and halftime.

The whole equipment for a team needed to play should fit on a single 120 cm x 80 cm table.

2.2 The Robots

1. The size of each robot is limited to 7.5 cm x 7.5 cm x 7.5 cm. The height of the RF communication antenna will not be considered in deciding a robot's size. The robots are allowed to equip with arms, legs etc., but they must comply with the size restrictions even with the appendages fully expanded.
2. The robots' weight may not exceed 650 g.
3. To enable infrared sensing a robot's sides should be colored light, except at regions necessarily used for robot functionality, such as those for sensors, wheels or a ball catching mechanism.
4. The robots should wear uniforms and the size of these is limited to 8 cm x 8 cm x 8 cm. These uniforms may not have other functions than to protect the robot and to carry the team patch. The robot must be fully functional without the uniform and it must be easily detachable.
5. Each robot must be fully independent, with powering and motoring mechanisms self-contained. Only wireless communication shall be allowed for all kinds of interactions between the host computer and a robot.
6. None of the robots, except the single goalkeeper, should be allowed to catch or hold the ball

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such that more than 30% of the ball is out of view either from the top or from the sides ([Appendix C](#)).

2.2.1 Patches

The topside of a robot must not be colored in orange. A color patch either blue or yellow, as assigned by the organizers per [Rule 3.2.1](#), will identify the robots in a team. All robots must have (at least) a 3.5 cm x 3.5 cm solid region of their team color patch, blue or yellow, visible on their top. A team's identification color might change from game to game, and the team color patch used should be detachable. When assigned with one of the two team colors the robots must not have any visible patches of those or similar colors used by an opponent team.

2.2.2 The Goalkeeper

A robot within its own goal area ([Rule 1.1.4](#)) shall be considered the "goalkeeper". The goalkeeper robot is allowed to catch or hold the ball only when it is inside its own penalty area (including the goal area). If the goalkeeper leaves his goal area and penalty area, he immediately stops being a goalkeeper. If two robots are in the goal area, no robot is a goalkeeper (cf. rule [4.5.1](#)). If no robot is in the goal area, the robot last being considered the goalkeeper will remain to be the goalkeeper until a different robot enters the goal area or the goalkeepers leaves the penalty area.

3 The Game

3.1 Game Duration

1. The game lasts 10 minutes with two periods of 5 minutes. Half time interval is 10 minutes. These times might be extended by organizers on advance notice. Game time is actual time played. The clock is paused during interruptions.
2. If a team is not ready to resume the game after the half time, additional 5 minutes shall be allowed. If even after the allowed additional time a team is not ready to continue the game, that team will be disqualified from the game.

3.2 Game Commencement and Progress

1. Well before the commencement of a game, either the transmission frequency or the color should be decided by the toss of a coin. This might be omitted if the teams agree on both.
2. Just before the commencement of the game, kickoff and side must be decided by the toss of a coin. The winning team may choose kickoff, the losing team must choose a side.
3. At game commencement each team must have 5 (Middle League) or 11 (Large League) properly working robots on the playground, e.g. robots controlled by the host computer. In case a team cannot start with 5 or 11 robots, the team will be disqualified. If robots become unfunctional during the game, the game may be continued, but at least the uniform / color patch of the robot(s) must be on the playground. In case the uniform breaks, the team must replace it.
4. At the beginning of game halves and after a goal has been scored, the ball is put at the center point. The attacking team will be allowed to position their robots freely in their own area and within the center circle. Then the defending team can place their robots freely in their own area except within the center circle. With a signal from the referee, the game is (re)started and all robots may move freely. The ball is to be kicked or passed towards the team's own side

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- first. If this is not done, the kick-off must be repeated. If the kick-off is done incorrectly again, a free-kick will be called in favor of the other team.
5. It is obligatory that the robots position themselves automatically on commencement of halves and after all game interruptions.
 6. At half time, the teams have to change their sides.

3.3 Winning

3.3.1 The Winner

A goal shall be scored when the whole of the ball passes over the goal line. The winner of a game shall be decided on the basis of the number of goals scored.

3.3.2 The Tiebreaker

1. If the tournament rules call for a tie breaker it should be resolved as follows: In the event of a tie after the second half, the winner will be decided by the sudden death scheme ("Golden Goal"). The game will be continued after a 5 minutes break for a maximum period of 3 minutes. The team managing to score the first goal will be declared as the winner. If the tie persists even after the extra 3 minutes game, the winner shall be decided through penalty-kicks.
2. Each team takes three penalty-kicks, which are carried out as per [Rule 4.10](#). The only differences to that rule are that
 - a) only a kicker and a goalkeeper are allowed on the playground and
 - b) the attacking robot may not touch the ball again after the goalkeeper has touched it. After the referee's whistle, the goalkeeper may come out of the goal area.
3. A penalty kick is over when
 - a) the ball has entered and left the goal area or
 - b) the goalkeeper catches the ball or
 - c) a foul occurs or
 - d) 10 seconds have passed or
 - e) the attacker touches the ball again after the goalkeeper has touched it.
4. In case of a tie even after the three-time penalty-kicks, additional penalty-kicks shall be taken one-by-one until the winner can be decided.

3.4 Interruptions

The game is interrupted whenever the referee whistles. The human operator must then stop all robots using the communication between the robots and the host computer.

3.4.1 Fouls

A foul as per [Rule 4](#) will interrupt the game. Only the ball may be handled manually. The robots must be able to move independently to the desired position.

3.4.2 Relocations

Relocation of robots may be done by a human operator only

1. during timeouts and halftime or
2. when a robot has fallen.

At all other times human members of teams may not relocate the robots.

3.4.3 Timeouts and Substitutions

Four timeouts with a maximum combined duration of eight minutes shall be permitted while a game is in progress. During timeouts and at half time, unlimited substitutions can be made. During the game (including interruptions) no substitutions may be made without calling a timeout. When a timeout is desired while the game is in progress, the concerned team should call 'time-out' to notify the referee and the referee will stop the game at an appropriate moment. The game will restart with a free-ball on the side of the calling team if the time-out has been called during the game.

3.5 Transmissible Information

1. While the game is not in progress, the teams may transmit any information to and from the robot they wish. Upon the commencement of the game through the referee, the teams may send a start signal to their robots. If the referee interrupts or ends the game, the teams must immediately send a stop signal to their robots.
2. While the game is in progress, the humans must not interact in any way with their system under any circumstances. The system must send and receive any information to and from the robots autonomously during that time.
3. If a team interacts with their system (no matter if host system or robots, including but not limited to keyboard, mouse or joystick commands) during the game, it will be disqualified immediately.

4 Fouls

4.1 Advantage

The referee may decide not to call a foul, if the fouled team is in advantage.

4.2 ...Causing A Free-Ball

1. Colliding with a robot of the opposite team, either intentionally or otherwise: the referee will call such fouls that directly affect the play of the game. The free-ball will be on the side of the offending player's team.
2. The referee will call a free-ball when a stalemate occurs for 10 seconds outside the goal area. For this rule, a stalemate occurs when no robot is touching the ball or if two or more opposing robots are blocking the ball.

4.3 ...Causing A Free-Kick

1. When a defender robot intentionally pushes an opponent robot who possesses the ball or when it affects the game, a free kick will be given to the opposite team. This does not apply to normal fights for the ball.
2. Ramming an opponent robot in a way that might cause damage to it, no matter if the offending robot is playing the ball or not.
3. When any robot other than the goalkeeper catches the ball. This is also true if one or more robots of one team block the ball for more than 10 seconds without the influence of the other team (outside of the goal area).
4. (*Applies to Large League only*)

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At any time, both teams may only have a maximum number of five robots each (excluding goalkeeper) in the areas marked as A and C in [Appendix D](#). (Areas A and C are the thirds of the field directly in front of the respective goal. Their outer end is marked by the outer free-ball robot position on the field).

That means that at any time, the maximum number of robots in an outer third of the field is eleven (five robots of one team + five robots of the other team + one goalkeeper).

If a team violates this rule, a free-kick is called. The free-kick ball position will be on the side of the violating team, at the position marked as FK in [Appendix A](#) and [Appendix D](#) (i.e. equidistant between the two free-ball positions (FB) on the field).

4.4 ...Causing A Goal-Kick

1. Charging the goalkeeper by touching or directly or indirectly blocking or pushing (with and without the ball inbetween) while the goalkeeper is inside its goal area.
2. Attacking with more than one robot in the goal area of the opposite team. Or attacking with more than three (Middle League) or more than four (Large League) in the penalty area of the opposite team. A robot is considered to be in the goal / penalty area if it is more than 50% inside, as judged by the referee. The penalty area contains the goal area.
3. Goalkeeper catching the ball with its appendages (if any) in its own penalty area.

4.5 ...Causing A Penalty-Kick

1. Defending with more than one robot in the goal area. A robot is considered to be in the goal area if it is more than 50% inside, as judged by the referee. An exception to this is the situation when the additional robot in the goal area is not there for defense or if it does not directly affect the play of the game. The referee shall judge the penalty-kick situation.
2. Failure of the goalkeeper to kick out the ball from his goal area within 10 seconds (unless blocked by the other team, in that case it is a goal kick, see [Rule 4.4.1](#)).
3. Only the referee is allowed to reposition the robots outside of timeouts and halftime. The award of a penalty-kick shall penalize repositioning the robots without the referee's permission.
4. It is referred to as handling, as judged by the referee, when a robot other than the goalkeeper catches the ball. It is also considered as handling, if a robot firmly attaches itself to the ball such a way that no other robot is allowed to manipulate the ball.
5. If there are more than three (Middle League) or more than four (Large League) robots of the defending team in the penalty area. (A robot is considered to be in the penalty area if it is more than 50% inside, as judged by the referee. The penalty area contains the goal area.)

4.6 ...When It's Not A Foul However

1. It is permitted to push the ball and an opponent player backwards provided the pushing player is always in contact with the ball.
2. When the situation is caused by the opposite team.
3. If the situation has no effect on the game whatsoever. It is upon the referee to judge such situations.

4.7 Free-Ball ([Appendix H](#))

When a free-ball is called within any quarter of the playground, the ball will be placed at the relevant free ball position (FB) ([Appendix H](#)). One robot per team will be placed at locations 25

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cm (Middle League) or 30 cm (Large League) apart from the ball position in the longitudinal direction of the playground. Other robots (of both teams) can be placed freely outside the quarter where the free-ball is being called, but with the rule that the defending team will get their preference in positioning their robots. The game shall resume when the referee gives the signal and all robots may then move freely.

4.8 Free Kick ([Appendix E](#))

The ball will be placed at the position where the called foul happened, but outside of the penalty area. All defending robots must be placed outside of a circle with 20 cm (Middle League) or 30 cm (Large League) radius around the ball position. When positioning robots, all other game rules still apply (e.g. limited numbers of robots in penalty area; zone rules in Large League). The defending team gets precedence in placing their robots. Upon the restart of the game by the referee, no defending robot may move into the 20 cm / 30 cm circle before the ball has been moved or 10 seconds have passed. This can be achieved manually or automatically.

4.9 Goal Kick ([Appendix G](#))

During goal kick only the goalkeeper will be allowed within the goal area and the ball can be placed anywhere within the goal area. Other robots of the team shall be placed outside the goal area during the goal kick.

(Middle League only)

The defending team will get preference in positioning their robots within their own side of the playground. The attacking team (i.e. the team performing the goal kick) can then place its robots anywhere on the playground. The game shall restart normally with the referee's whistle.

(Large League only)

Five defending robots must be located in the center third (area B in [Appendix D](#)), the other five robots in their own third. Five attacking robots must be located in the opponent half and the other five robots in their own half. The defending team will get preference in positioning their robots.

4.10 Penalty-Kick ([Appendix F](#))

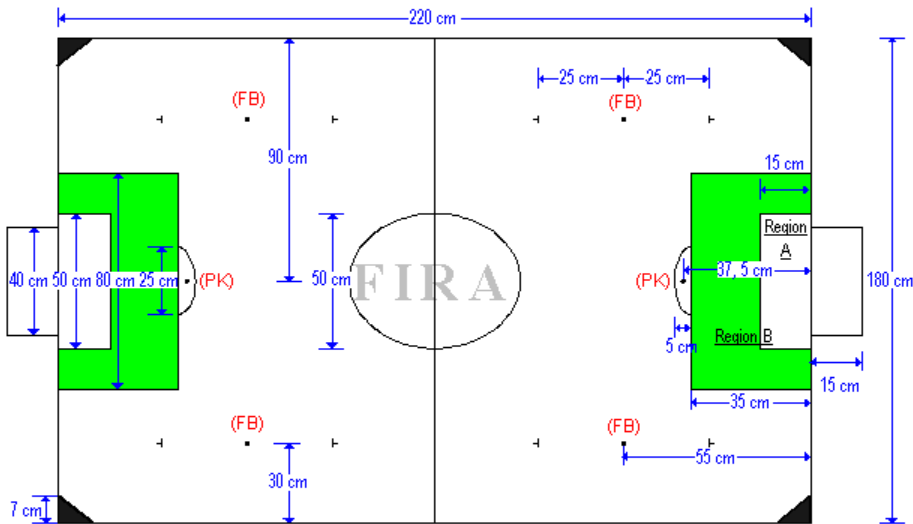
When the referee calls a penalty-kick, the ball will be placed at the relevant penalty kick position (PK) on the playground ([Appendix F](#)). The robot taking the kick shall be placed behind the ball. While facing a penalty kick one of the sides of the goalkeeper must be in touch with the goal line. If the goalkeeper robot has a preferred main axis of movement (i.e. is not an omnidirectional robot), the robot must be positioned so that this axis is parallel to the goal line. Other robots shall be placed freely within the other side of the half-line, but the defending team will get preference in positioning their robots. After the referee's whistle only the robot that performs the penalty may move. All other robots must only move after the ball has been moved or 10 seconds have passed. This may be achieved automatically or manually. The robot taking the penalty-kick may kick or dribble the ball.

(Large League only)

[Rule 4.3.4 \(Zone rule\)](#) does not apply to the penalty-kick situation. If the penalty-kick does not end in a goal immediately, i.e. a normal game is resumed, robots must move to comply with [Rule 4.3.4](#).

Appendix A

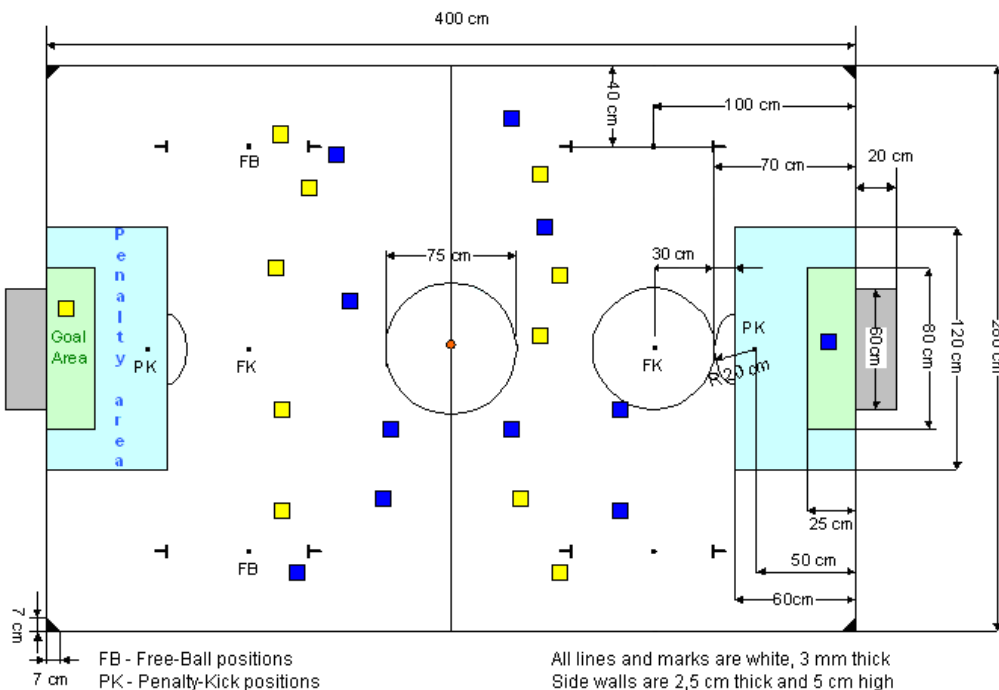
The FIRA MiroSot Middle League Playground



FB - Free-Ball positions
 PK - Penalty-Kick positions
 Free-Kick to be performed at location of foul

All lines and marks are white, 3 mm thick
 Side walls are 2,5 cm thick and 5 cm high
 top view black, interior side view white in color
 Region A - Goal Area (includes the goal)
 Region B - Penalty Area (includes Goal Area)

The FIRA MiroSot Large League Playground

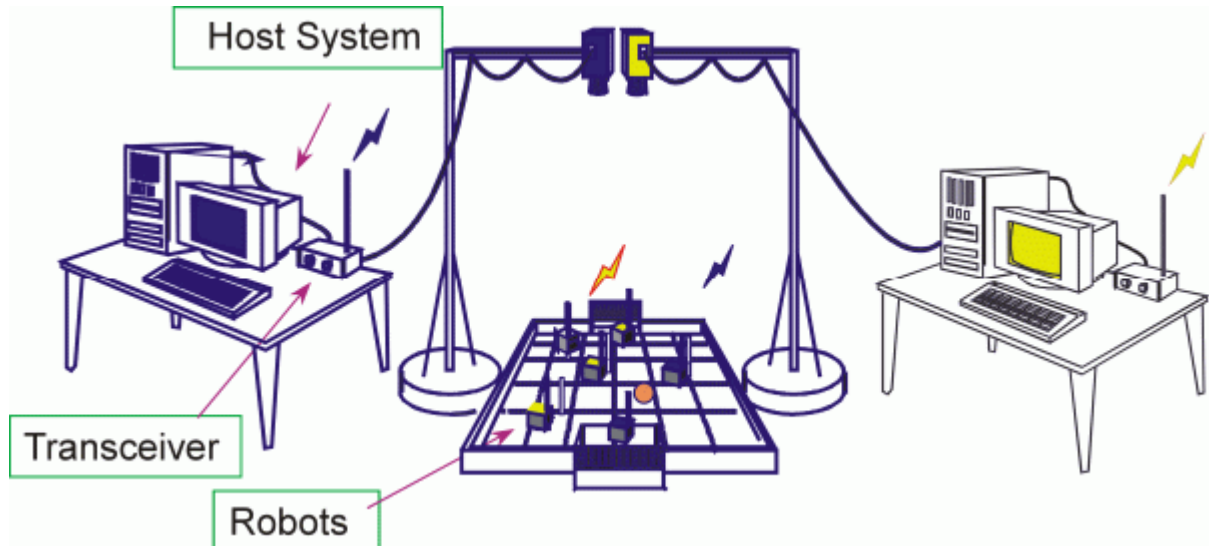


FB - Free-Ball positions
 PK - Penalty-Kick positions
 FK - Free-Kick position as of rule 4.3.4 (Zone rule)
 All other Free-Kicks to be performed at location of foul

All lines and marks are white, 3 mm thick
 Side walls are 2,5 cm thick and 5 cm high
 Top view black, interior side view white in color

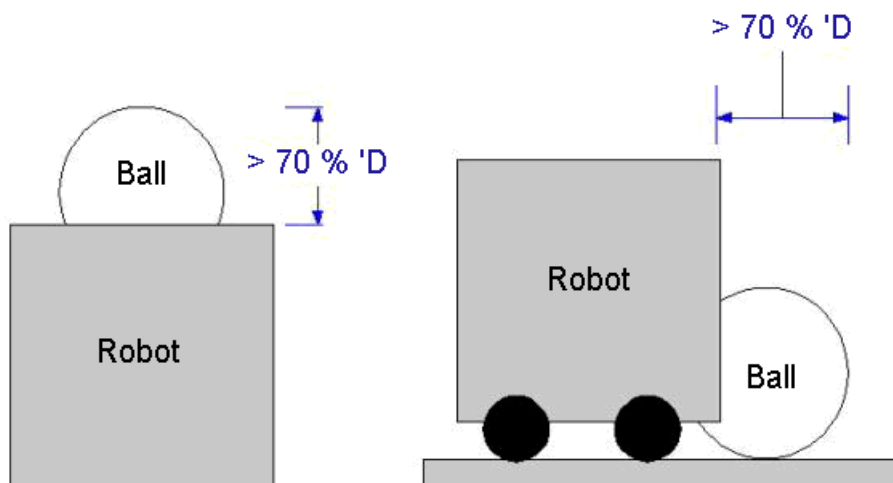
Appendix B

Overall System



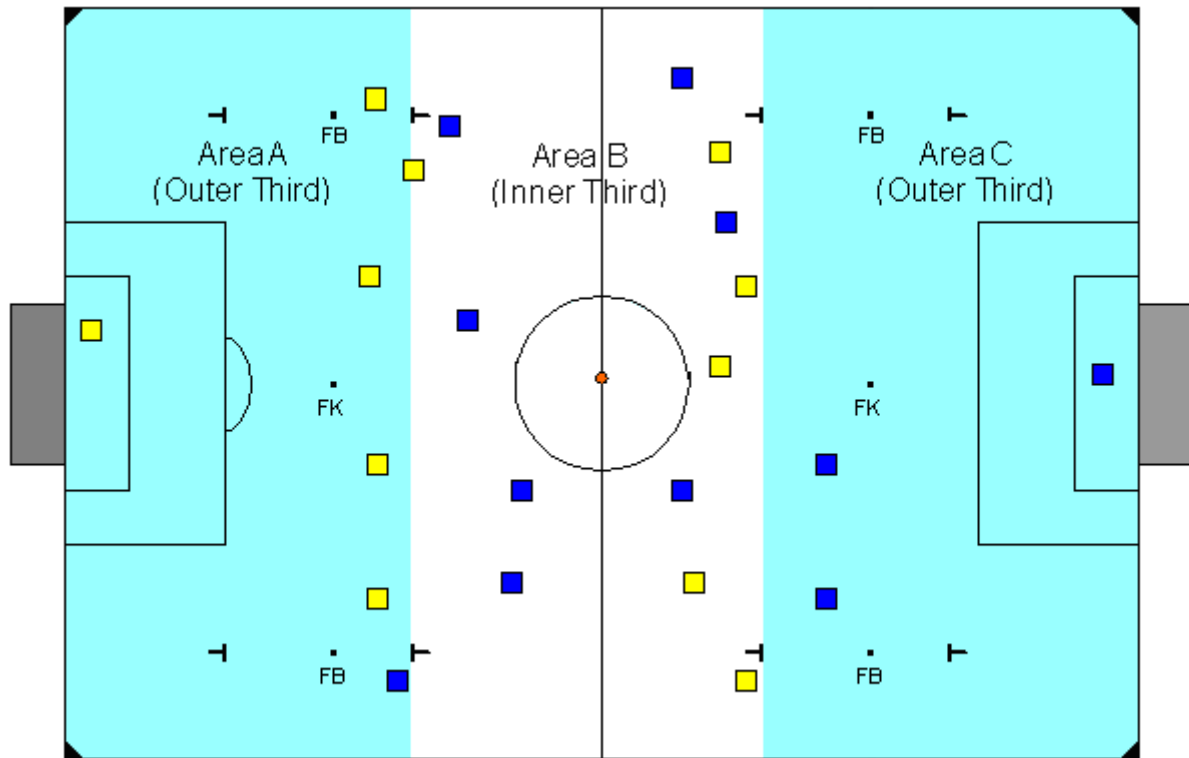
Appendix C

30% Rule



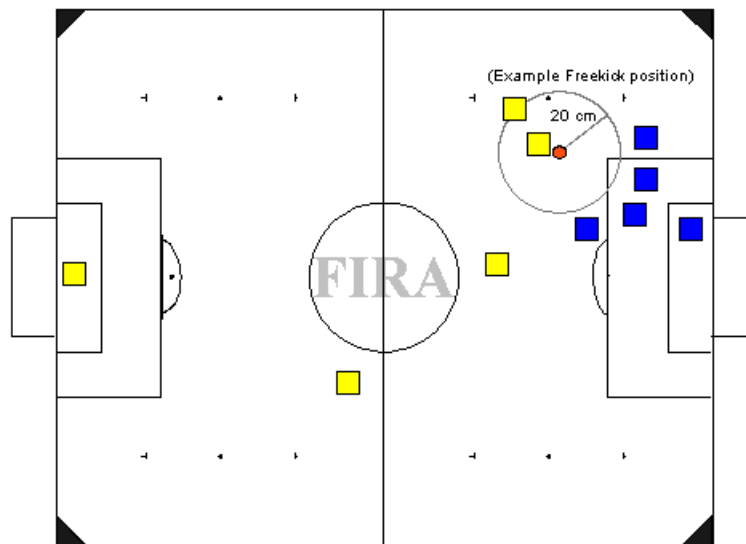
Appendix D

Zone rule (4.3.4, Large League only)



Appendix E

Free-Kick



Picture shows Middle League, similar in Large league.
Circle radius in Large League: 30 cm

Free-Kick situations:

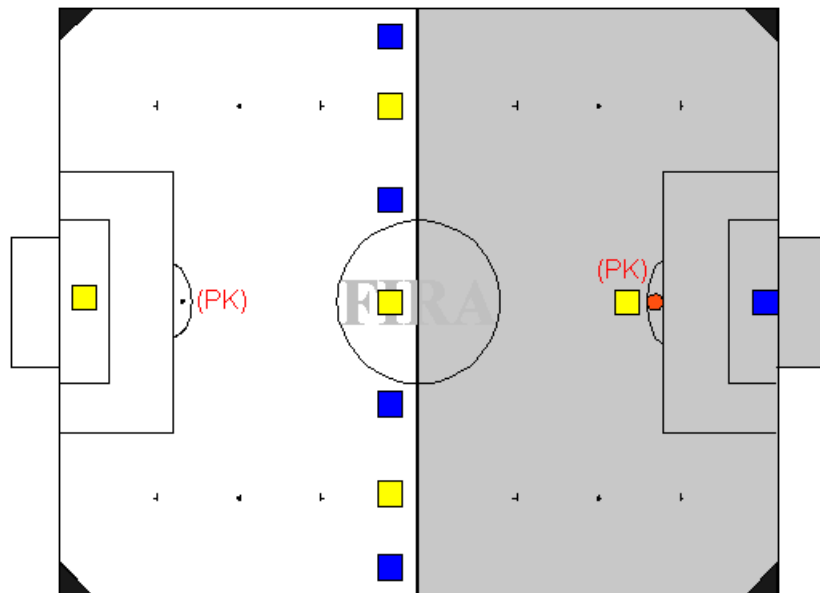
- 1) Defender intentionally pushes opponent (with ball or when it affects the game).
- 2) Ramming opponent in a way that might damage it.
- 3) Any robot other than the goalkeeper catches the ball. Or a single robot or single team obstructs the ball for more than 10 seconds.
- 4) Large League only: Violation of rule 4.3.4 (zone rule)

Robot and ball positions:

- 1) Ball on the position where the foul has happened, but outside of penalty area.
Large League only: If the free-kick has been called because of violation of rule 4.3.4, the free-kick ball position is stated in Appendix A (equidistant between free-ball points)
- 2) All defending robots out of 20 cm (Middle L.) or 30 cm (Large L.) radius circle.
- 3) Defending team places first.
- 4) No defending robot may move into the circle before the ball has been moved or 10 seconds have passed.

Appendix F

Penalty-Kick



Picture shows Middle League, similar in Large League

Penalty-Kick situations:

- 1) Defending with more than one robot in the goal area (except if it's not defending or does not affect the play).
- 2) Goalkeeper does not kick the ball out of his goal area within 10 seconds (except if stalemated by the other team).
- 3) A human operator touches a robot without the referee's permission outside timeout and halftime.
- 4) If any robot other than the goalkeeper attaches itself to the ball ("Handling").
- 5) More than three (Middle League) or more than four (Large league) robots of the defending team in the penalty area (including the goal area).

Robot and ball positions:

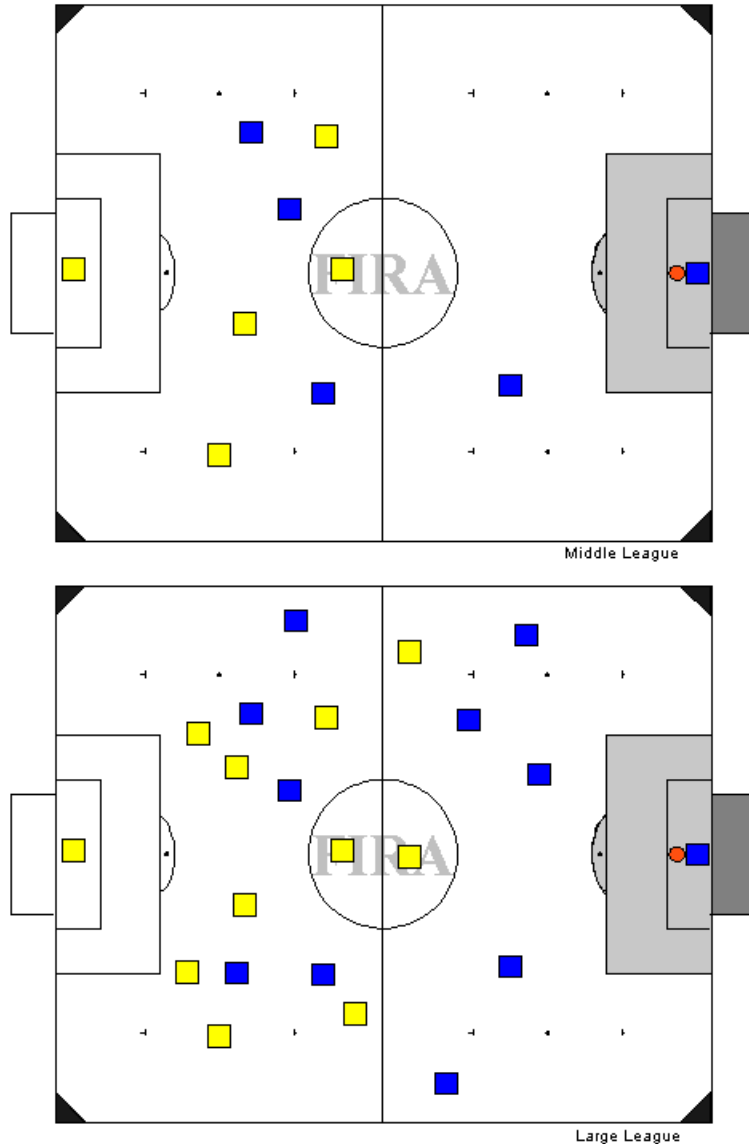
- 1) Ball on the penalty-kick position (PK), see Appendix A.
- 2) Robot taking the kick behind the ball.
- 3) Defending goalkeeper must touch goal line, main axis of movement parallel to goal line (if applicable).
- 4) All robots besides kicker and goalkeeper in other half. Defending team positions first. Large League only: Rule 4.3.4 (Zone rule) does not apply.
- 5) After the referee's whistle, kicker moves first. All other robots move after the ball has moved or 10 seconds have passed.
- 6) Large League only: If the game resumes normally (i.e. not an immediate goal), rule 4.3.4 resumes effect and the robots must strive to comply with it.



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Appendix G

Goal-Kick



Goal-Kick situations:

- 1) Touching or directly or indirectly blocking or pushing the goalkeeper.
- 2) Attacking with more than one robot in the opposite goal area.
- 3) Attacking with more than three (Middle League) or more than four (Large League) robots in the opposite penalty area (contains goal area).
- 4) Goalkeeper catches the ball with its appendages (if any) in its own penalty area.

Robot and ball positions:

- 1) The ball can be placed anywhere in the goal area.
- 2) Only the goalkeeper is allowed in the goal area.

Middle League:

- 3) Defending team positions first, within their own half
- 4) Attacking team places their robots anywhere on the field.

Large League:

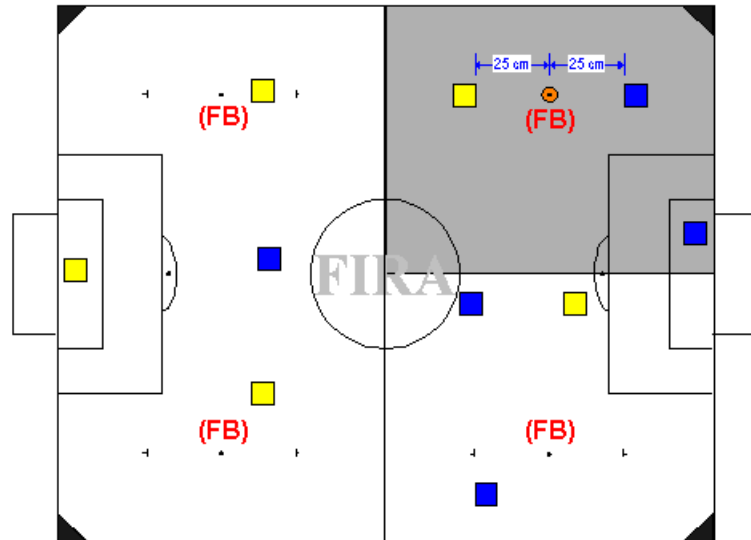
- 3) Five defending robots in the center third (area B, Appendix D), the other five robots in their own third. Defending team places first.
- 4) Five attacking robots in the opponent half, the other five in their own half.

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Appendix H

Free-Ball



Picture shows Middle League, similar in Large League

Free-Ball situations:

- 1) Colliding with a robot of the opposite team if it affects the play (Free-Ball on the side of the offending team.)
- 2) Stalemates outside of goal area for 10 seconds with no or two or more robots of different teams involved.

Robot and ball positions:

- 1) Ball on the appropriate Free-Ball position (FB).
- 2) Robots on the appropriate Free-Ball robot positions. 25 cm (Middle League) or 30 cm (Large League) apart horizontally, defending team towards their goal.
- 3) All other robots can be placed freely outside of the Free-Ball quarter, the goalkeepers may be placed anywhere in the goalarea. The defending team will position first.

Appendix I Recommendations For The Organizers

- **Lighting**

Special care should be taken of the lighting of the fields. Avoid lighting with bright spots on the field (a small number of powerful halogen lights, for example). The best solution are usually fluorescent lamps directly above the field, but be aware that these a) might not be bright enough and b) are out the box not flicker-free and therefore unsuitable for some teams. Because of that ample fluorescent lamps - flicker-free (100 Hz or above) - are recommended.

- **The Field**

It is important that the field is in good condition and that it is build exactly to the specifications of the rules. It is very helpful for game-play if the field is non-reflective and has a surface texture with high grip. A surface paint that has proven to be suitable is blackboard paint.

- **Game Mode**

The exact mode of the game should be made available to the participating teams of a tournament well in advance.

Following the rules of "real" soccer, two games modes are common:

Knock-Out Games

A team will play against one other team. The winner of the game will advance to the next round, until only one team is left.

League-Type Games

Every team will play all other teams (or a random subset of all other teams). A won game will be worth 3 points, a lost game 0 points. A draw will earn both teams 1 point. The team with the most points after all games wins. In case of a draw between two or more teams, the following criteria will decide (listed in order of precedence):

- Goal difference in all group matches
- Greatest number of goals scored in all group matches
- Greatest number of points obtained in the group matches between the teams concerned
- Goal difference resulting from the group matches between the teams concerned
- Greater number of goals scored in all group matches between the teams concerned
- Drawing of lots (or tossing a coin) by the organizers

There need to be rules what happens if a team is being disqualified or forfeits a game (e.g. how many points (usually three) and how many goals (depends on the strength of all teams, usually 20) will be awarded). The rules must be known in advance, otherwise a fair solution might be impossible. If no rules are made known in advance, the above suggestions apply.

Combination

If there are many teams in a tournament, a combination of both game types is common. There will be a suitable number of preferably evenly large groups where teams will play league-type games. The winner (and the runner-up or even more teams) will advance to the final knock-out round.

Game duration

The game duration stated in [Rule 3.1.1](#) is the standard duration, which might be extended by the organizers if this is made know well in advance before the competition. It is com-

mon to play extended half-final and final games, usually in 2 halves with 7 or 7,5 minutes each.

- **Audience**

Please make sure that the audience has a good view of the field. Direct view of the field has proven to be much more interesting than a projection onto a screen.

The field and the team areas themselves should not be accessible to the audience, since it might disturb the teams or accidental damage to valuable equipment might occur. Please be aware that under most lighting conditions people close to the field (this includes the referee!) will cast a shadow on the field, which might disadvantage some teams. TV crews sometimes have specific lighting needs that collide with the needs of the teams. These should be addressed beforehand. Some teams might need a while to reconfigure their vision systems after a strong lighting change has occurred.

- **Location, Time Planning**

The location of a game should be chosen with care. Please take into account the needs of the audience and of the teams. Storage for equipment of teams currently not playing a game should be provided.

Preparation time for a game will be around one hour. It might be more if it is the first game of a tournament or the camera mountings are problematic.

A game will usually take 30 to 45 minutes, but in some cases up to an hour. In cases where a tie-breaker is possible, one and a half hours should be allotted for every game. Please note that the games might go much faster or sometimes even slower, depending on the strength of the teams and - mostly - on the good ability of their robots to reposition themselves automatically during breaks.

If punctual beginning of a game is crucial (e.g. a large and/or important audience or TV teams) plenty of additional time should be planned as preparation time for the teams before the game and delayed games before the important game should be taken into account.

- **Team care**

If necessary, be prepared to assist teams from abroad with customs regulations and other necessities (see [Appendix J](#)).

Appendix J Recommendations For The Teams

- The teams are recommended to prepare a suitably large number of color patches, other than blue and yellow, for individual robot identification.
- Depending on the organizer's wishes, teams might be requested to provide a referee for other team's games. Please be prepared in advance (and read [Appendix K](#)).
- If travelling abroad, take care of possibly different electricity systems. Be prepared to use unknown camera mountings and play under different lighting conditions. Enquire about customs regulations well in advance.
- Your team must conform to rule [3.4.2 \(Relocations\)](#). Please note that this rule refers to repositioning the robots. Minor adjustments to the robots (e.g. direction changes) might be made by a team with the permission of the referee.
- The camera mounting heights in rule [1.2.3](#) can be reached by using a 1/3" CCD camera with 6 mm Lens (1/2 inch C-Mount). If it is located 3 meters above the playground an area



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of 3.2 m by 2.4 m can be covered.

Appendix K Recommendations For The Referee

If you are a first-time referee, please make sure you know the rules to avoid discussions at the field. You are advised to watch games of other teams and pay attention to the referee's decisions during those games. Robot soccer can be a very fast game!

The following list is meant to assist referees in deciding difficult situations and to avoid different interpretations of the rules.

- **Ball and robot positions**

Please keep in mind that a robot position is being considered to be where more than 50% of the robot's volume are. That means that a robot is only inside an area, e.g. the goal area, if it is more than 50% inside it.

The ball however must be 100% inside a region to be inside it. That means that a goal will only be scored if the ball has fully passed the goal line.

- **Fouls**

refer to [Rule 4.1 \(Advantage\)](#), [Rule 4.6.2 \(Situations caused by opposite team\)](#) and [Rule 4.6.3 \(No-effect-on-the-game-rule\)](#)

These three rules are catch-it-alls for situations that have not been foreseen by the rules. Their use is at the discretion of the referee only. Please note that these rules must be used by the referee in extreme situations only. If they are being used regularly in a game without a "normal" rule catching, it might be a misinterpretation.

These rules are there to avoid disadvantages to teams that do play a little "unusual" - and their opponents. At the same time, they are meant to speed up play.

- **Substitutions and timeouts**

refer to [Rule 3.4.2 \(Relocations\)](#), [3.4.3 \(Timeouts and Substitutions\)](#) and [4.5.3 \(Handling by humans\)](#)

A team may take up to 4 timeouts during a game with a cumulated time of up to 8 minutes. That means that e.g. one timeout with 8 minutes or 4 timeouts with 2 minutes each are possible. Care must be taken to time the teams' timeouts.

No substitutions of robots may be made outside of timeouts and halftime. During timeouts and halftime, unlimited substitutions may be made.

If a team calls for a timeout, the referee should take care to choose a suitable moment in the game. It is preferred that timeouts are called when the calling team is attacking, e.g. when the ball is in the opponent's half.

- **Repositioning the robots**

refer to rule [3.4.2 \(Relocations\)](#) and [4.5.3 \(Handling by humans\)](#)

Repositioning the robots outside of halftime is strictly forbidden. If a team is doing so, a penalty will be called. If a team is not able to autoposition their robots, it will be disqualified.

Please note that these rules refer to repositioning the robots. Minor adjustments to the robots (e.g. direction changes) might be made by a team with the permission of the referee.

- **Number of robots allowed in the penalty area**

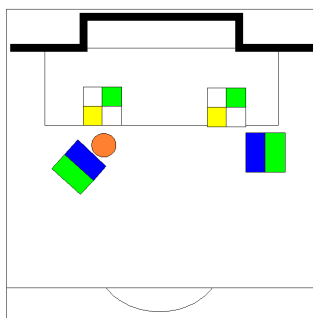
refer to rule [4.5.5](#)

A maximum number of three (Middle League) / four (Large League) robots is allowed in the penalty area, which contains the goal area. That means that e.g. one goalkeeper (in the goal area) and two / three other robots (outside the goal area) or three / four robots (outside of the goal area) are allowed.

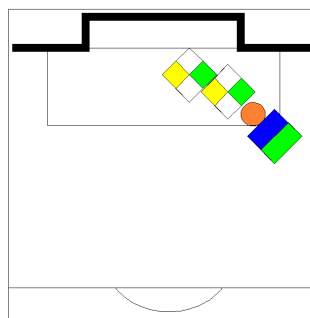
- **Two defending robots**

refer to [rule 4.5.1 \(More than one defending robot in the goal area\)](#)

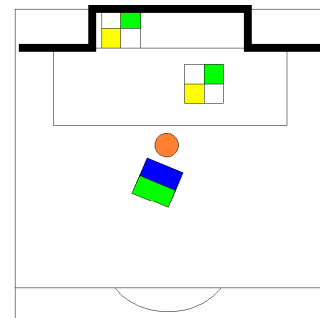
Defending with two or more robots in the goal area is not allowed and a penalty kick will be called in favor of the attacking team. However that only applies if the robots are actually defending. The referee must judge these situations carefully. If a robot is just standing around involuntarily or moves into the goal area by accident (e.g. bad robot control...) or is pushed inside by the other team, it is not defending. If a robot moves into the goal area intentionally and stays there in order to build up a second defense, the referee should call it a penalty, even "if it does not directly affect the play of the game", because the robot is there for defense in a try to exploit the rules. Such a case, however, will be rather rare. Generally speaking, we expect the team to follow the rules, so be rigorous in using this rule.



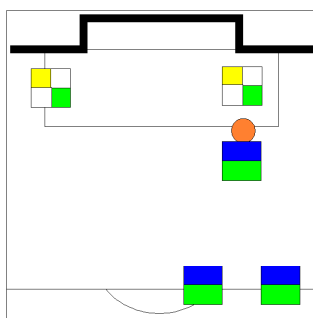
Penalty
Left defending robot blocks way to the goal for left attacker, if passed, right defender blocks the way for the right attacker



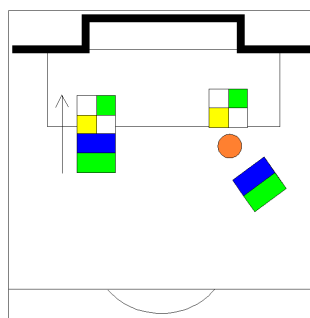
Penalty
2nd robot defending, stops attacker (no robot is considered a goalkeeper!)



Penalty
Robot in goal stops ball from entering goal (goal belongs to goal area)



No penalty
2nd robot not defending, does not influence game (no robot is goalkeeper!)



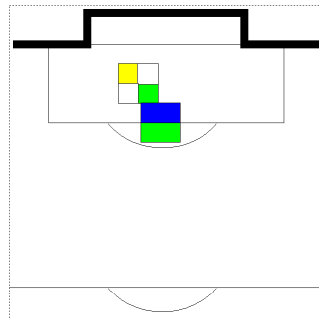
No penalty
Defending robot is pushed into the goal area by attacker (Foul, free-ball)

No Penalty
If the ball can enter the goal, it is no penalty (i.e. the goal is deep enough and the robot in the goal does not stop the ball from fully entering the goal)

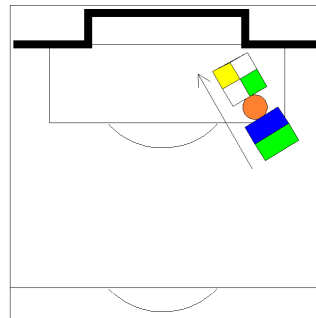
- **Goalkeeper charging**

refer to [Rule 4.4.1](#).

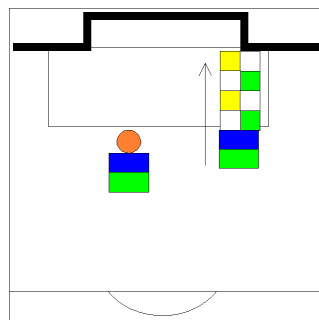
It is not allowed to touch or directly or indirectly block or push the goalkeeper inside the goal area, no matter if the ball is inbetween the attacking robot and the goalkeeper or not. Indirectly blocking or pushing refers to situations where an attacking robot pushes an opponent robot to block or push the goalkeeper.



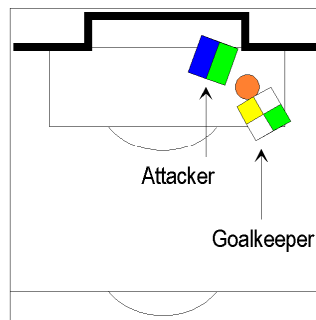
Goal-kick
Touching the goalkeeper



Goal-Kick
Pushing the goalkeeper



Goal-Kick
Indirectly blocking/pushing
the goalkeeper



Goal-Kick
Blocking the goalkeeper

- **Colliding with other robots**

refer to rule [4.2.1 \(Robot collisions\)](#) and rule [4.3.2 \(Ramming that might cause damage\)](#)

The difference in these two rules is the severity of the collision.

If a robot collides with another robot – intentionally or not – the referee should call free-ball, if it affects the game. This has to be judged by the referee.

Examples:

- The parting of an attacker from the ball by colliding with it from behind, which is obviously unsuitable to get control over the ball but might part the attacker from the ball anyway.

- An attacker tries to reach the goal showing no sign of opponent awareness, i.e. it tries to push its way to the goal by sheer force.

If a robot rams another robot in a way that might or does cause damage to it, a free-kick must be called, if the attacking robot can be blamed for the foul (e.g. because it has rammed the other robot from the side or shows no sign of opponent awareness).

Example:

<http://www.inovamicro.com>

- A robot rams another robot and the other robot falls or breaks, and the attack was from the side or the attacker shows no opponent awareness.

- **Stalemates**

refer to [Rule 4.2.2](#), [Rule 4.3.3](#), and [Rule 4.5.2](#).

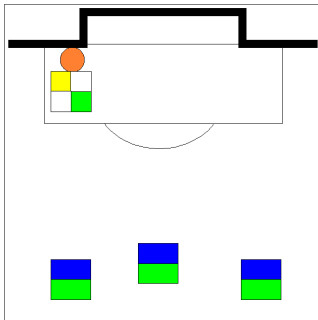
Inside of the goal area:

If the goalkeeper is not able to move the ball out of the goal area within 10 seconds, a penalty will be called. This is also true if it is obstructed by his own team. If he is obstructed by the other team, a goal-kick will be called immediately (blocking the goalkeeper).

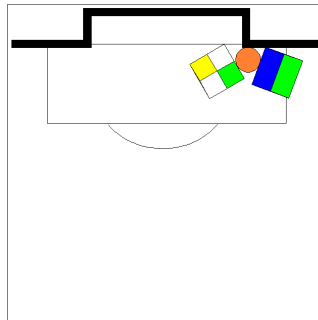
Outside of the goal area:

If the ball hasn't moved in 10 seconds, a free-ball will be called in the quarter the ball lies in. This is the case if no robot tries to move the ball or two robots of different teams fight over the ball, but none of them is able to move it because they block each other.

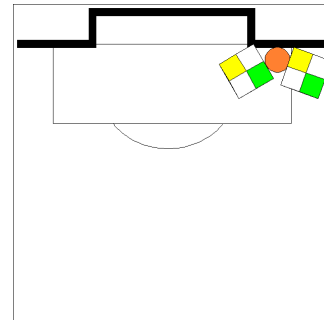
However, if only one robot (or more than one robot of the same team without any robot of the other team involved) obstructs the ball so that it hasn't moved in 10 seconds, it is assumed that the team tried to block the ball in order to let playing time pass. In these cases, a free-kick will be awarded to the opponent team.



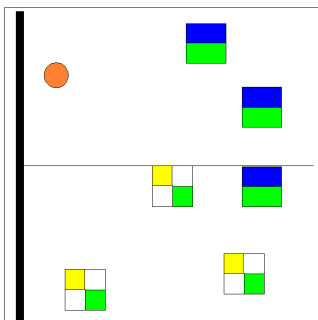
Penalty-Kick after 10 sec
Goalkeeper fails to move the ball out of its goal area within 10 seconds



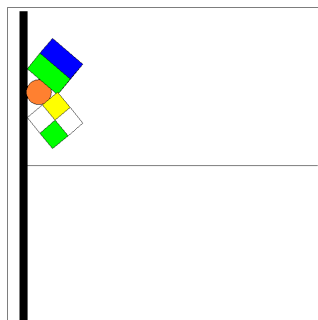
Goal-Kick
Blocking the goalkeeper (see rule 4.4.1)



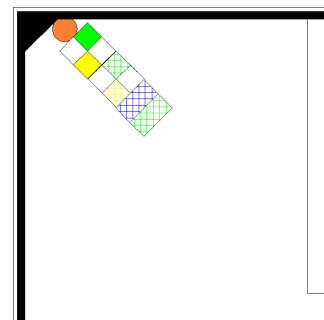
Penalty-Kick after 10 sec
The goalkeeper fails to move the ball out of the goalarea because of his own team's robot. (If the second robot were in the goal area, it would be an immediate penalty if an opponent robot even slightly tried to attack, i.e. is at least somewhat close.)



Free-Ball after 10 sec
If the ball has not been moved within 10 seconds, it is a free-ball in the quarter the ball is in.



Free-ball after 10 sec
If the ball cannot be moved because it is blocked by two or more robots (from different teams), it is a free-ball in the quarter the ball is in.



Free-Kick after 10 sec
Unobstructed robot is unable to free ball. If there is a second robot of the same team, the situation does not change. Only an opponent robot would change this to free-ball.