

MAKE X

V3.0

机器人挑战赛

Robotics Competition

2024 - 2025

RULES GUIDE

MAKEX INSPIRE



2025.01

www.makex.cc/en



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2023.09	1.1	4.4 Additional Statement of Mysterious mission
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2025.01	3.0	2.1 Participation Requirements 3 Competition Procedure 4.4 Missions Introduction and Scoring State Judgement 6.3 Operation Rules

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MAKE X



1. Introduction

1.1 About MakeX

MakeX is an international robotics competition and education platform that promotes multidisciplinary learning within the fields of science and technology. It aims at building a world where STEAM education is highly appreciated and where young people are passionate about innovation by engaging them in exciting Robotics Competition, STEAM Carnival, Tech Event, Educational Conference etc.

As the core activity of MakeX, the namesake MakeX Robotics Competition provides exciting, challenging and high-level competitions in the spirit of creativity, teamwork, fun and sharing. It is committed to inspiring young people to learn Science (S), Technology (T), Engineering (E), Art (A) and Mathematics (M) and apply such knowledge in solving real-world problems.

1.2 MakeX Spirit

Creativity: we advocate curiousness and innovation, encouraging all contestants to create unique high-tech works with their talent, and challenge themselves for continuous progress!

Teamwork: we advocate solidarity and friendship, encouraging all contestants to develop a sense of responsibility and enterprising spirit, and sincerely working with their partners for win-win development !

Fun: we encourage contestants to build a positive, healthy mindset in the competition. Enjoy the journey and grow in the process.

Sharing: we encourage contestants to have an open mind as a maker and share their knowledge, responsibility, and joy with everyone, including their teammates and competitors.

MakeX spirit is the cultural cornerstone of the MakeX Robotics Competition. We hope to provide a platform for all contestants, mentors and industry experts to exchange ideas, study and grow up, and help young people acquire new skills during creation,



learn to respect others in teamwork, gain an enjoyable life experience in the competition, take delight in sharing with the society their knowledge and responsibility, and work hard to achieve their grand aspiration of changing the world and creating the future!

1.3 About MakeX Inspire

MakeX Inspire is a single-mission competition program for teenagers aged 6-12.

The competition is adopted with a single mission format, which greatly lowers the threshold of participating in the competition. The concept of no restrictions on how a mission can be completed has enhanced the fun and participation experience of the competition, which also fully exercises the abilities of critical thinking and strategic planning of contestants.

2. Competition Application

2.1 Participation Requirements

Participants: Contestants shall participate in teams, the number of contestants is 1 for each team, with 1 mentor.

Age: Contestants must be teenagers or children between the age of 6-12 (born between January 2nd, 2012 and December 31, 2019), and the mentor must be at least 18 years old.

Identification Symbols: Each team must have a team logo, team name, and team slogan. Teams are encouraged to use uniforms, flags, posters, badges, pit area decorations, etc. to show the team culture.

2.2 Registration and Application

Contestants and mentors that meet participation requirements can register on the designated competition web page on MakeX official website (www.makex.cc/en). Each team should register with one registration form.

If the participating team wants to change their members before the competition, which leads to inconsistency with the registration information, they should inform

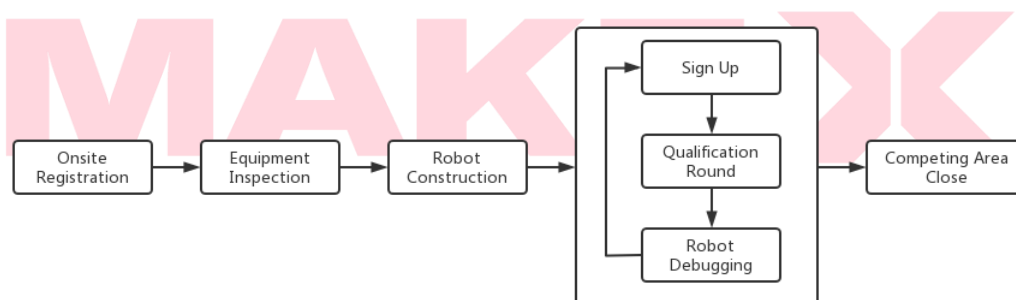
MakeX Robotics Competition Committee in advance to finish re-registration.

For more details about the registration and application, please refer to [MakeX Registration & Competition Application Guide](#)

3. Competition Procedure

Participating teams shall pay close attention to related notices and Competition Guide published before each competition. If the rules have some updates in the competition guide, the latest rules will be adopted for the competition. MakeX Competition Committee reserves the rights and final interpretation to amend competition rules and systems based on the actual situation of different competitions.

The schedule for each competition is determined by the actual situation, and generally includes the following procedures.



Onsite Registration

When a team arrives at the venue, mentors and contestants should show ID cards or other valid certificates (e.g., passport) for onsite registration and to get the competition pack. Mentors must inform team members about the fire exit, match schedule, arena, pits area, etc. Onsite registration and robot inspection will be closed once the match schedule is announced.

Equipment Inspection

Teams are required to bring the necessary parts to construct their robots. The organizer won't provide any parts or equipment. The teams must bring their own equipment, except for motors, servos, Bluetooth controller, batteries, wheels and tires,



all other equipment or mechanical parts must be scattered and can't be assembled in advance. Teams are not allowed to use commercial structures with mature designs. All parts shall not be welded, riveted, glued or other ways to form parts, structural parts for independent rectangular (including crankshaft-shaped), cylindrical (including gear-shaped, cone-shaped), square, ribbon-shaped, shaped body, etc. Teams that fail to pass the equipment inspection are not allowed to participate in the competition.

Robot Construction

Teams should finish their robot construction in the construction area (each team will have their own seat). Expect the referees, judges staff, and any third-party personnel like mentors or parents not allowed to enter the related areas in the venue. Teams can sign up for the competition according to their process of robot construction and get ready for the competition.

Competition Sign Up

Before entering the competing area, a team shall sign up at the entrance of the competing area and queue for the competition and not allowed to go back to the construction area after signing up. If the team needs to compete in the next qualification round, they will have to sign up again.

Qualification Round

Normally, each team will participate in 2 rounds of the match, including one random mission and one mysterious mission, each round contains 2 sessions of match. The session of qualification matches for teams to participate in may vary between different competitions, which is decided by the practical situation.

The random mission will be selected before the start of the qualification round. The head referee or staff will randomly draw one mission from the 10 missions numbered M01-M10. Once drawn, the mission number will be announced, and all participating teams will perform the same random mission. For details about the random mission and scoring, please refer to 4.4 Missions Introduction and Scoring State Judgement.

After the qualification round, teams will be ranked according to the following rules:

- (1) Ranked according to the team's highest score among all the qualification matches, teams with higher scores rank higher.
- (2) If the scores are the same, teams with shorter completion times rank higher.
- (3) If the above conditions are the same, teams who rank the same will have an



additional match, until the winner is decided.

Robot Debugging

After each session of match, the teams are allowed to go back to the construction area for robot debugging.

Competing Area Close

When the competing area is closed, teams are not allowed to sign-up for the competition anymore. Teams shall pay close attention to the time of competition sign-up and the competing area closes that announcement before the competition. The team didn't sign up for the competition when the competing area closing will be treated as giving up the qualification round.

4. Competition Details

The theme of the 2024-2025 season MakeX Inspire is "Smart Logistics".

With the arrival of the Industry 4.0 era, a new generation of revolutionary technology is changing our lives, and a large amount of human labour is being replaced by machines.

Smart logistics is to simulate modern factory logistics scenarios so that students can fully learn the advanced technologies such as the Internet of Things and artificial intelligence used in the scenarios, and make comprehensive use of mechanical structures, sensors, programming and other knowledge to complete the mission of automated handling, fixed-point placement and safe storage.

4.1 Introduction

MakeX Inspire is a single-mission competition program, each competition shall be completed by one team.

The singles match lasted for 150 seconds. After each match, the referee calculates the scoring according to the status of props at the scoring time.



Fig 4.1 Competition Arena Isometric View

4.2 Arena

The MakeX Inspire arena consists of a map and frame. The internal side of the frame is 1200 mm*1200 mm. The map included the starting area, storage center and warehouse area.

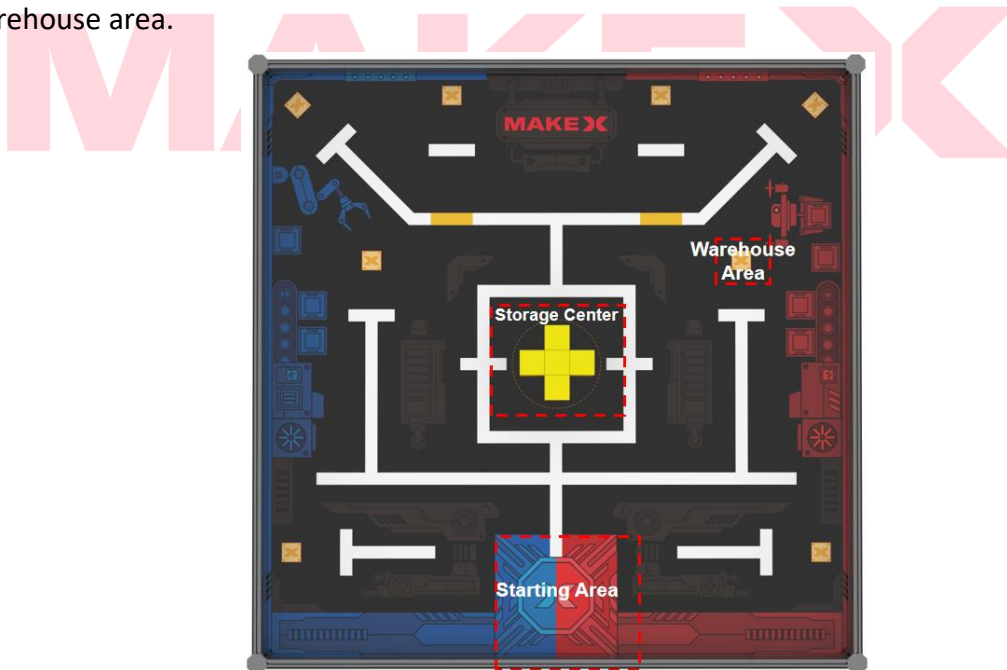


Fig 4.2-1 Areas on the Competition Arena

Areas in Detail:



Starting Area

The arena has one starting area with a size of 250mm*250mm.

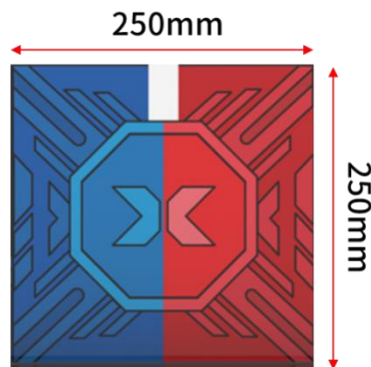


Fig 4.2-2 Starting area

Storage Center

The storage center is located in the center of the arena, a cross shape area consisting of five 50mm* 50mm squares.

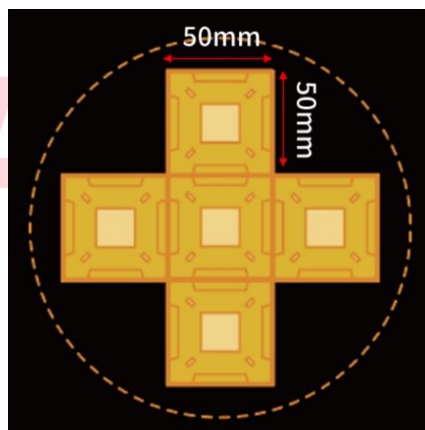


Fig 4.2-3 Storage center

Warehouse Area

The warehouse area is 50mm*50mm square as shown below, there are 8 warehouse areas in the arena, located in different position on the map.

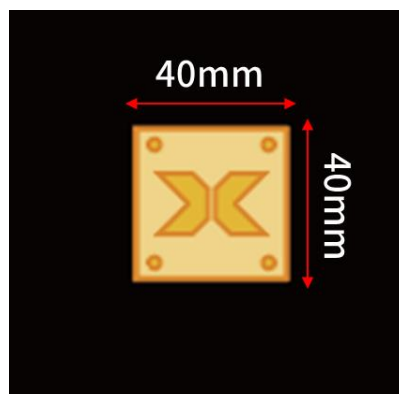




Fig 4.2-4 Warehouse area

4.3 List of Props

Name: Transport cube

Introduction: Square with length of 50mm (± 2 mm)

Color and Material: Yellow, EVA

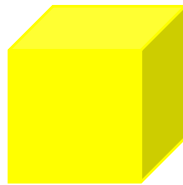


Fig 4.3-1 Transport cube

*Note: All arenas and props have reasonable deviation or error. The contestant can request for a replacement if props are available.

4.4 Missions Introduction and Scoring State Judgement

During the competition, each team will participate in 2 rounds of the match, including one random mission and one mysterious mission, each round contains 2 sessions of the match. The completed method is unlimited, teams can complete by using the automatic program or manually by using a Bluetooth controller.

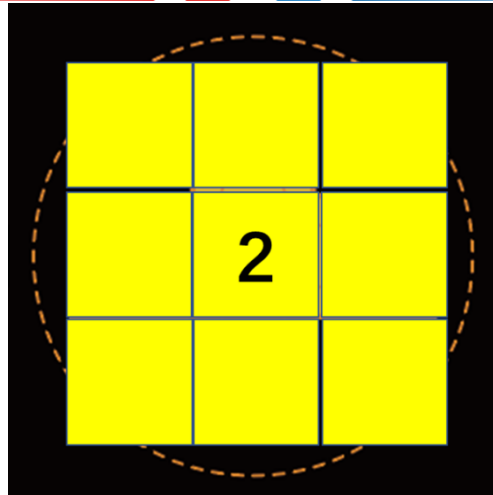
Mission background: As science and technology are constantly changing our lives, a large amount of human labour is being replaced by machines. The appropriate and efficient use of machines can improve the efficiency of logistics and transportation.

Random Mission

Mission No.: M01

Mission Target: There are 8 warehouse areas on the map. The contestant is required to transport the yellow cubes that are initially located in the central area to any warehouse area on the map and ensure that the warehouse area is covered with 2 layers of the yellow cube.

Starting Condition: 10 transport cubes are located in the storage centre(central area) with 2 layers. 9 cubes are placed on the lower layer that has contact with the map directly, in a 3*3 position. The left cube is placed on the upper layer and placed on top of the centre cube of the lower layer.

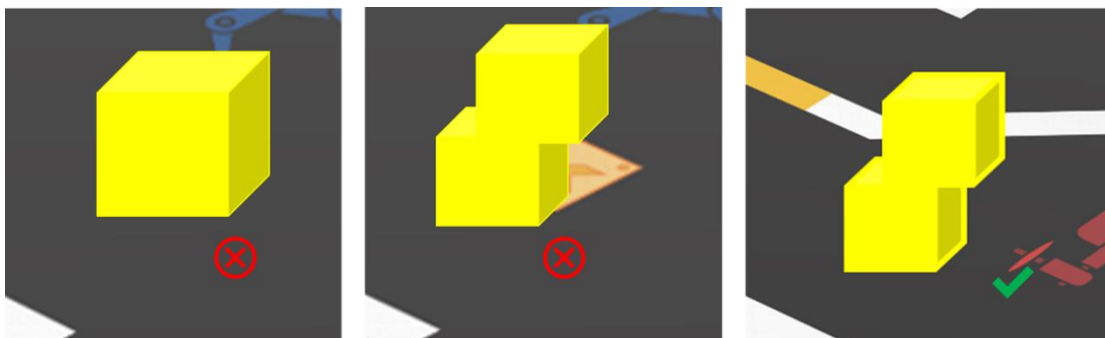


Initial placement of the cubes

Mission Score: Each warehouse area that is covered with 2 valid cubes counts 100 points.

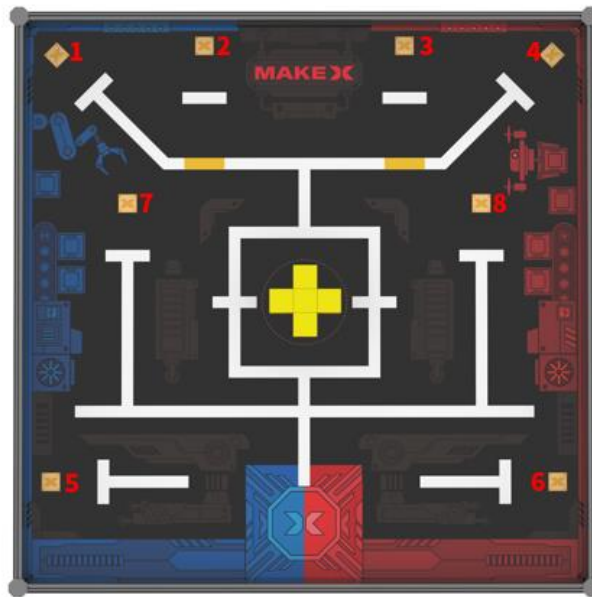
Scoring Judging: During the scoring time after each match, the warehouse area meets the below conditions:

- A. The warehouse is covered with 2 layers of yellow cubes.
- B. The yellow cube on the ground layer completely covers the warehouse area, has direct contact with the arena and does not contact the robot directly. The yellow cube on the upper layer only has contact with the other yellow cube that fully covers the warehouse area and does not contact the robot directly.

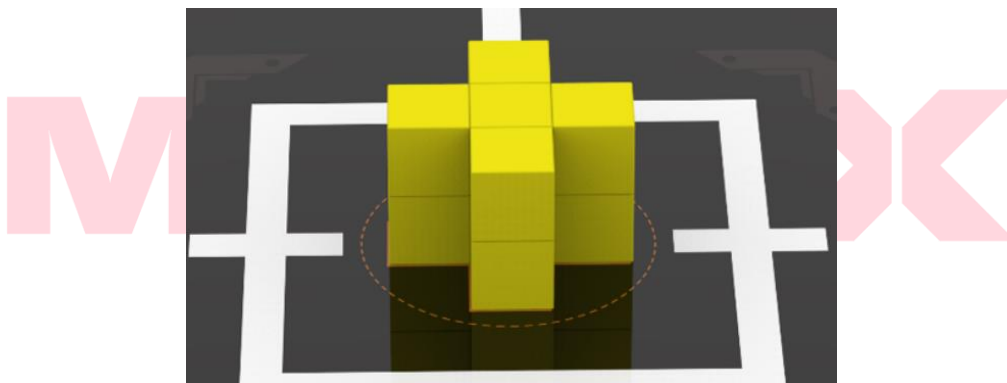


Mission No.: M02

Mission target: There are 8 warehouse areas on the map. The contestant is required to transport the yellow cubes that are initially located in the central area to the designated warehouse area on the map. The warehouse areas are numbered as shown in the figure below, in which the warehouse areas numbered 1, 2, 3, 4, 5 and 6 are completely covered by a single layer of yellow cube, and the other two warehouse areas numbered 7 and 8 are completely covered by 2 layers of yellow cubes.



Starting Condition: 10 transport cubes are located in the storage centre(central area) with 2 layers. Each layer has 5 cubes, placed as the "cross" sign.



Initial placement of the cubes

Mission Score: If the warehouse areas numbered 1, 2, 3, 4, 5 and 6 are completely covered by one layer of yellow cube, each corresponding warehouse area gets 50 points. The warehouse areas numbered 7 and 8 are completely covered by 2 layers of yellow cubes, each corresponding warehouse area gets 100 points.

Scoring Judging:

During the scoring time after each match, the warehouse areas numbered 1, 2, 3, 4, 5 and 6:

A. The yellow cube completely covers the warehouse area, has direct contact with the arena and does not contact the robot directly.

B. These warehouse areas shall only be placed with 1 layer of yellow cube. If there are



2 layers of yellow cubes in these areas, the area won't get any points.

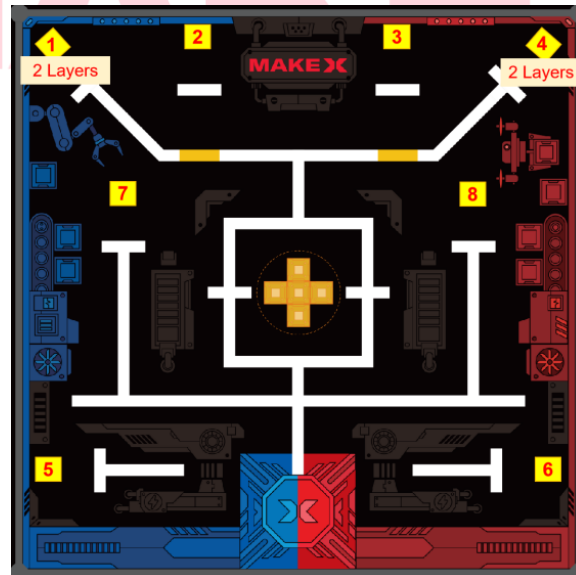
During the scoring time after each match, the warehouse areas numbered 7 and 8:

- A. The yellow cube on the lower(ground) layer completely covers the warehouse area, has direct contact with the arena and does not contact the robot directly.
- B. The yellow cube on the upper layer only has contact with the yellow cube that fully covers the warehouse area and does not contact the robot directly.
- C. The corresponding warehouse area is covered with 2 layers of yellow cubes. If there's only one layer of the cube in the warehouse, the warehouse won't get a point.

Mission No.: M03

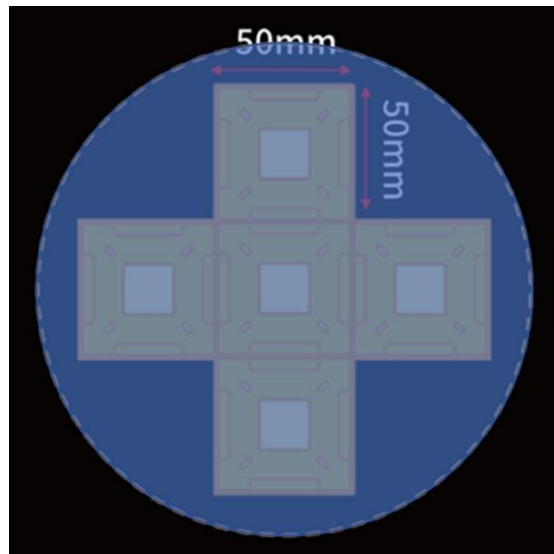
Mission target: There are 8 warehouse areas on the map. The contestant is required to transport the yellow cubes that are initially located in the warehouse areas to the central area on the map.

Starting Condition: The warehouse areas are numbered as shown in the figure below, in which the warehouse areas numbered 1 and 4 are covered by 2 layers of the yellow cube, and the warehouse areas numbered 2, 3, 5, 6, 7 and 8 are covered by 1 layer of yellow cube.



Mission Score: Each yellow cube with its vertical projection completely into the central area counts 50 points.

Scoring area statement: the central area refers to the blue round area shown in the below pictures, which is the area within the circular dotted line in the centre of the map.

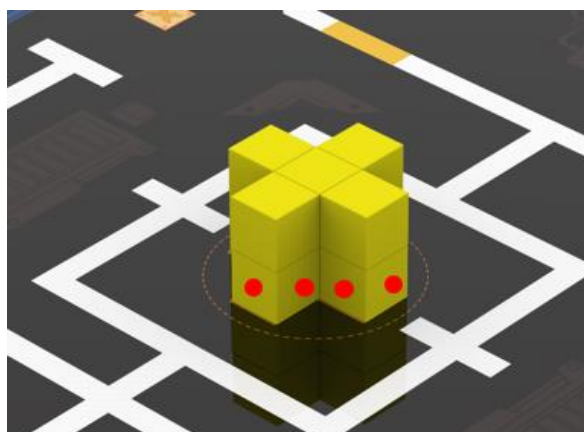
**Scoring Judging:**

During the scoring time after each match, the vertical projection of the yellow cube is completely located in the central area and does not contact the robot directly.

Mission No.: M04

Mission target: There are 8 warehouse areas on the map. The contestant is required to transport the yellow cubes that are initially located in the central area to any warehouse area on the map. It's required that the warehouse area has to be covered by 2 layers of the cube and the cube with the red dot sticker shall be placed on top, the blank yellow cube shall be placed on the bottom.

Starting Condition: 10 transport cubes are located in the storage centre(central area) with 2 layers. Each layer has 5 cubes, placed as the "cross" sign. Five yellow cubes with red dot stickers are placed on the bottom layer. Five yellow cubes without red dot stickers are placed on the top layer.



Initial placement of the cubes

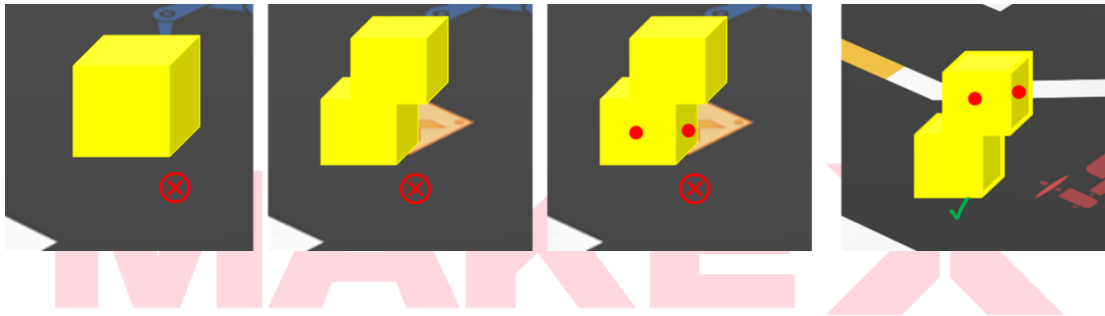


Mission Score: Each warehouse area that is fully covered with two layers of yellow cube counts 100 points.

Scoring Judging:

During the scoring time after each match, both of the following conditions must be met for scoring:

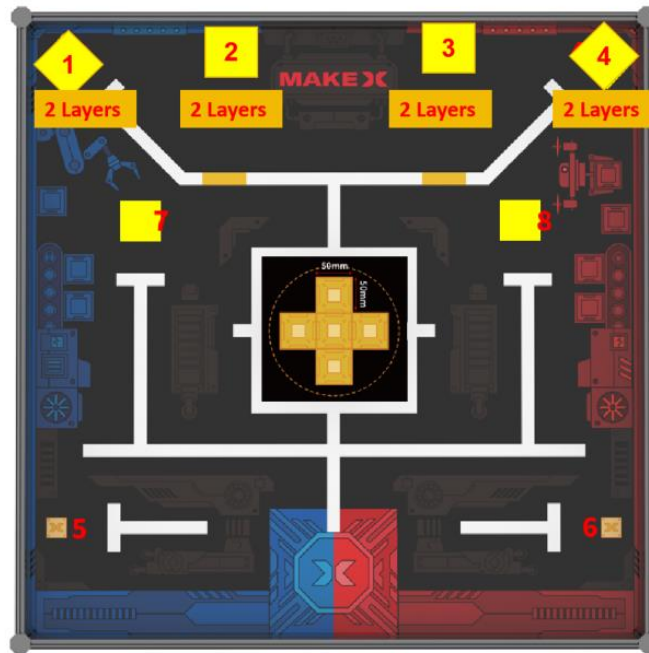
- A. The warehouse is covered with 2 layers of yellow cubes.
- B. The vertical projection of the blank yellow cube on the lower layer completely covers the warehouse area, has direct contact with the arena and does not contact the robot directly. The yellow cube with the red dot on the upper layer only has contact with the other yellow cube that fully covers the warehouse area and does not contact the robot directly.



Mission No.: M05

Mission target: There are 8 warehouse areas on the map. The contestant is required to control the robot to sort and transport the yellow cubes to the starting area as required. The yellow cube with a red dot shall be sorted and placed in the red zone of the starting area, and the blank yellow cubes shall be sorted and placed in the blue zone of the starting area.

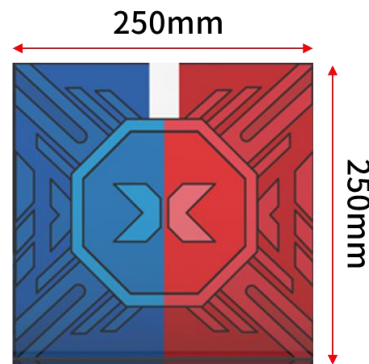
Starting Condition: The warehouses are numbered as in the picture below. The warehouse numbered 1,2,3,4 is fully covered by 2 layers of cubes, the bottom layer is the cube with the red dot and the upper layer is the blank yellow cube. The warehouse numbered 7 is fully covered by one yellow cube with a red dot. The warehouse numbered 8 is fully covered by one blank yellow cube.



Initial placement of the cubes

Mission Score: Each successfully sorted yellow cube counts 50 points.

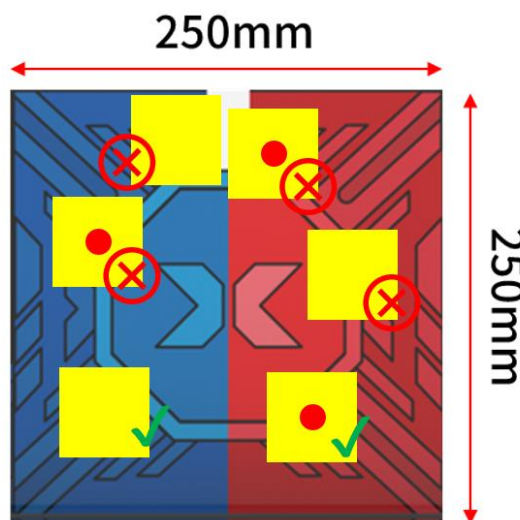
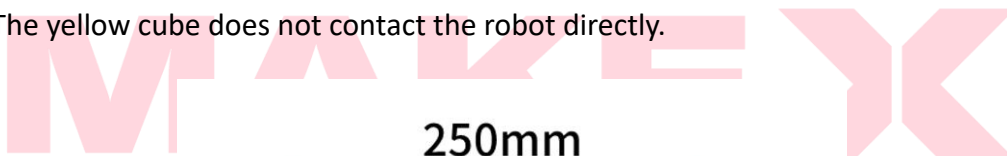
Scoring area statement: The starting area is the scoring area. In this case, the red-colored part of the base color is the red area, and the blue-coloured part of the base color is the blue area; neither of the 2 base-colored areas contains the white patrol line part.



Scoring Judging:

During the scoring time after each match

- A. The vertical projection of the yellow cube with the red dot is fully located in the red area of the starting area. The vertical projection of the blank yellow cube is fully located in the blue area of the starting area.
- B. The yellow cube does not contact the robot directly.

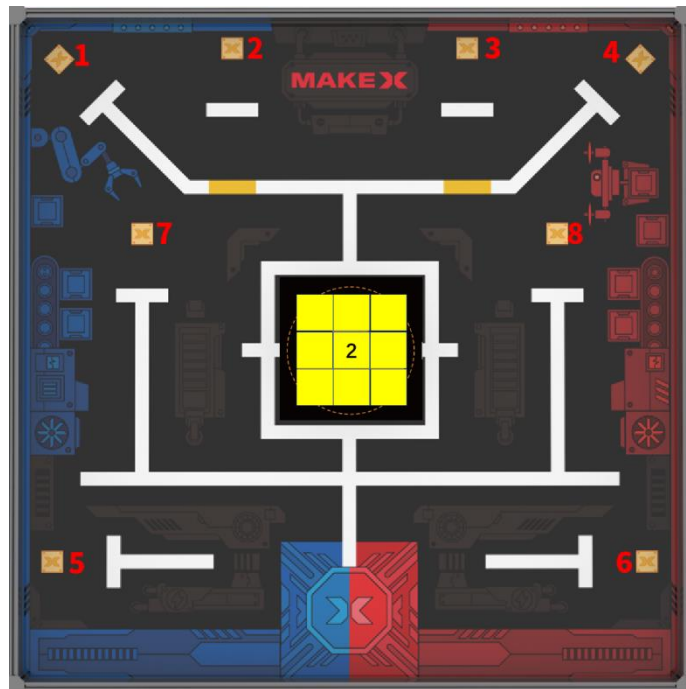


Mission No.: M06

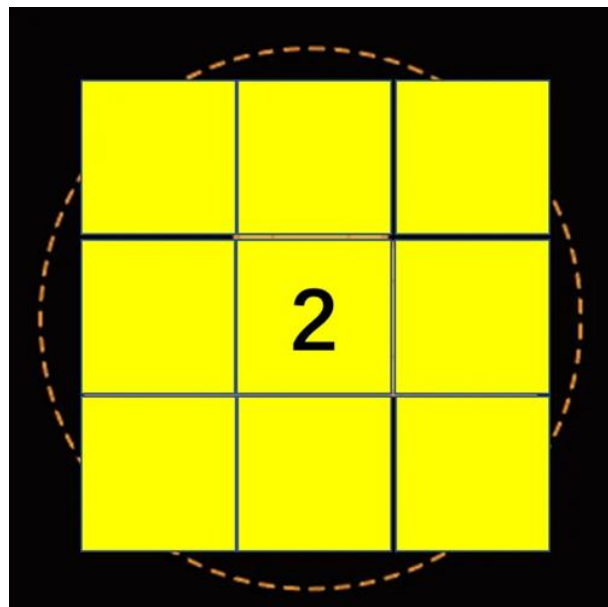
Mission target: There are 8 warehouse areas, with 4 located in the blue area (specifically, warehouse 1, 2, 5, and 7) and 4 in the red area (specifically, warehouse 3, 4, 6, and 8). The contestant is required to place the yellow cubes into the designated warehouse according to the mission. The warehouse in the blue area need to be



completely covered by a single layer of yellow cube to get points, while the warehouse in the red area need to be completely covered by two layers of yellow cubes to score points.



Starting Condition: 10 transport cubes are located in the storage center (the central area). The first layer consists of 9 cubes arranged in a 3x3 position, and the second layer consists of 1 cube placed in the center, making a total of 10 cubes.



Initial placement of cubes

**Mission Score:**

- A. Each warehouse in the blue area that is completely covered by one yellow cube scores 50 points.
- B. Each warehouse in the red area that is completely covered by 2 layers of cubes scores 100 point.

Scoring Judging:

During the scoring time after each match, valid cubes in blue area warehouses must be met with the following two conditions for scoring in:

- A. The warehouse must be completely covered by a single layer of yellow cubes that are in direct contact with the arena and not in direct contact with the robot.
- B. In the blue area, each warehouse must have exactly one valid layer of one yellow cube; if two layers are placed, the warehouse will not score any points.

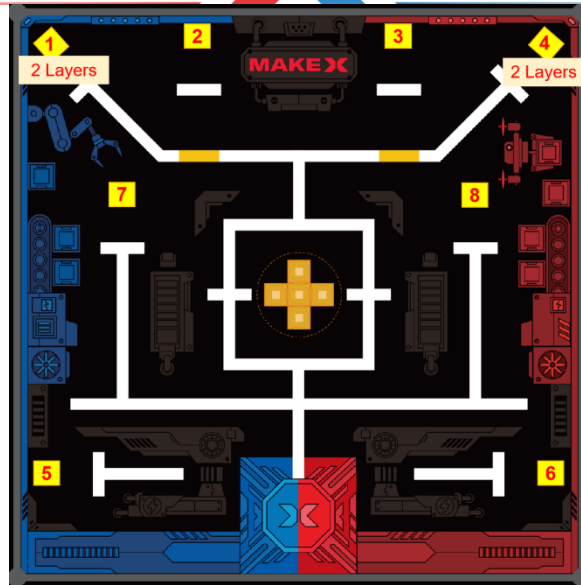
During the scoring time after each match, valid cubes in red area warehouses must be met with the following two conditions for scoring in:

- A. The warehouses in red area must be covered by the first layer of yellow cubes, be in direct contact with the arena, and not be in direct contact with the robot.
- B. The second(upper) layer of yellow cubes must be in direct contact only with the yellow cubes that completely cover the warehouses and not in direct contact with the robot.
- C. In the red area, each warehouse must have exactly two valid layers of yellow cubes; if only one layer is placed, the warehouse will not score any points.

Mission NO.: M07

Mission target: There are 8 warehouse areas on the map. The contestant is required to transport the yellow cubes that are initially located in the warehouse areas to the central area on the map.

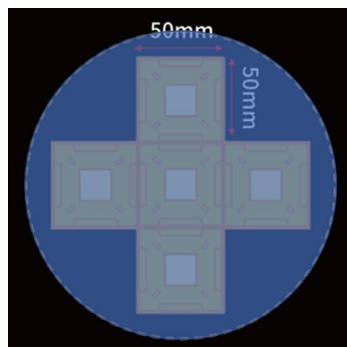
Starting Condition: The warehouse areas are numbered as shown in the figure below, in which the warehouse areas numbered 1 and 4 are covered by 2 layers of the yellow cube, and the warehouse areas numbered 2, 3, 5, 6, 7 and 8 are covered by 1 layer of yellow cube.



Mission Score: Yellow cubes that are placed in the central area will receive points as:

- A. 2 layers of the cube: 50 points
- B. 3 layers of the cube: 60 points
- C. 4 layers of the cube: 70 points
- D. 5 layers of the cube: 80 points
- E. 6 layers of the cube: 90 points
- F. The maximum points of the mission will be 530 points.

Scoring area statement: the central area refers to the blue round area shown in the below pictures, which is the area within the circular dotted line in the centre of the map.



Scoring Judging:

During the scoring time after each match,

- A. The vertical projection of the yellow cube is completely located in the central area

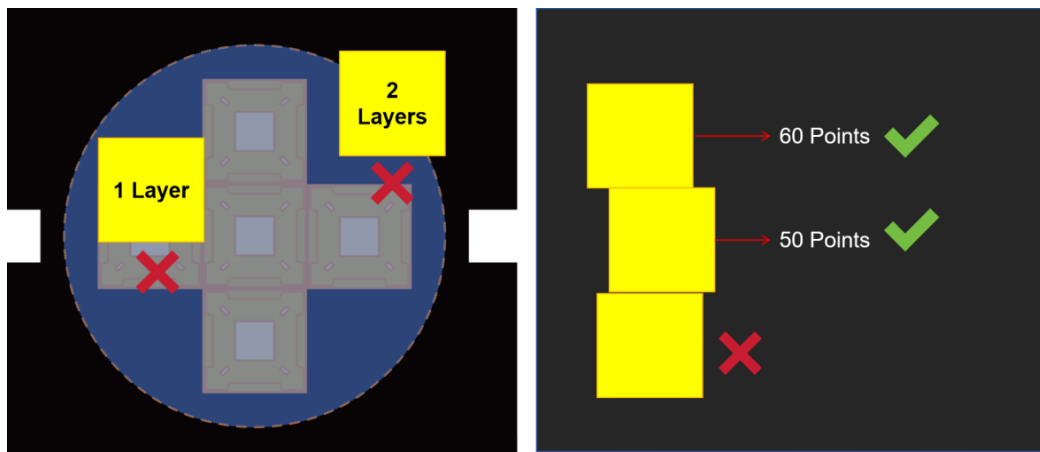
and has no direct contact with the robot;

B. The yellow cube on the second(upper) layer only has contact with the yellow cube that fully covers the warehouse area and does not contact the robot directly;

C. Yellow cubes on the third or higher levels are only in direct contact with the yellow cubes on the lower level.

D. The maximum layer of the cube is 6 layers.

The corresponding yellow cubes that meet the above requirements will get points.



Mission NO.: M08

Mission target: The central centre on the map contains 10 numbered cubes labelled 1-10, which the robot needs to move into the warehouse area and make the sum of the numbers of the cubes stored in each warehouse is 10. Each warehouse area can hold up to two levels of cubes at maximum.

Starting Condition:

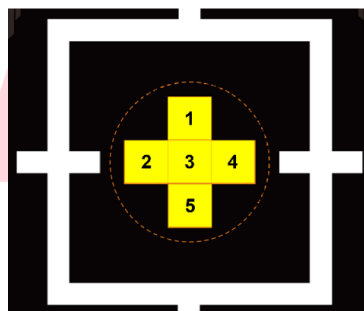
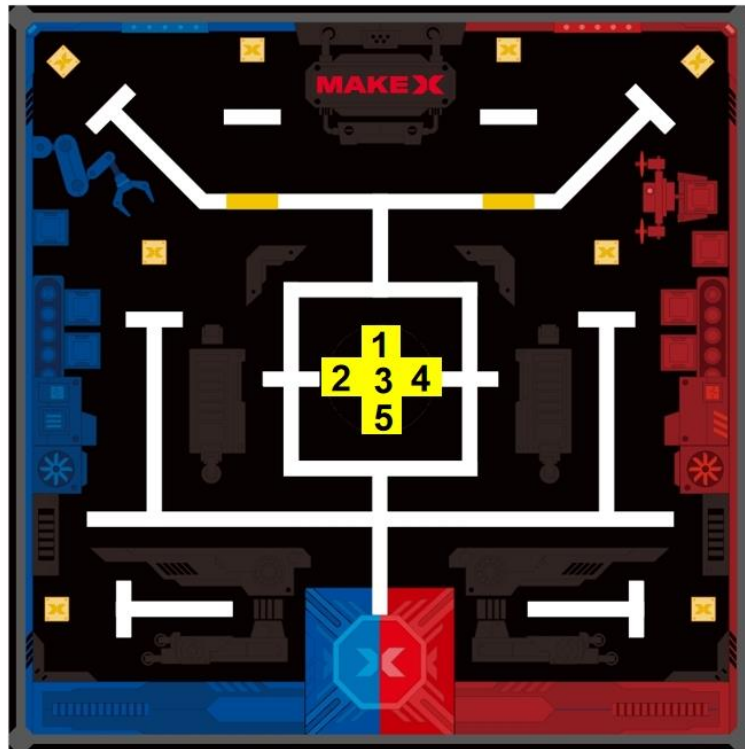


Diagram of the Upper cube

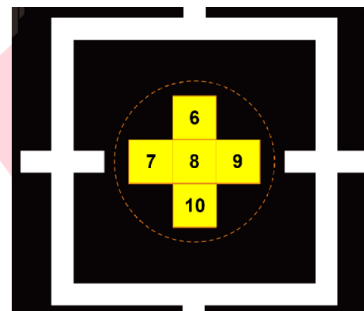


Diagram of the Lower cube

Mission Score: If the sum of squares on each storage space is 10, the relevant warehouse area gets 100 points.

Scoring Judging:

During the scoring time after each match,

- A. The sum of the number of cubes that are stacked in the warehouse area is equal to 10.
- B. The vertical projection of the yellow cube on the lower layer completely covers the warehouse area, has direct contact with the arena and does not contact the robot directly.
- C. The yellow cube on the upper layer only has contact with the other yellow cube that fully covers the warehouse area and does not contact the robot directly.

D. The maximum layer of the cube in each warehouse area is 2 layers. If over 2 layers, the warehouse will not get any points.

Meets the above condition and successfully placing the numbered squares that add up to 10 in a warehouse area counts for 100 points.

Mission NO.: M09

Mission target: The central center on the map contains 10 yellow cubes, each representing a transport box. These yellow cubes are marked with five different colors—red, blue, green, purple, and orange—with two cubes for each color. The task is to move the cubes with the same color markers to the same warehouse area.

Starting Condition: The central center contains 2 red cubes, 2 orange cubes, 2 blue cubes, 2 green cubes, and 2 purple cubes.

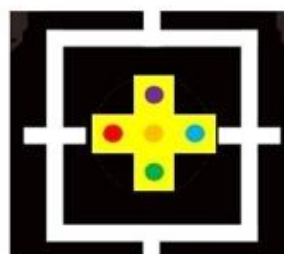
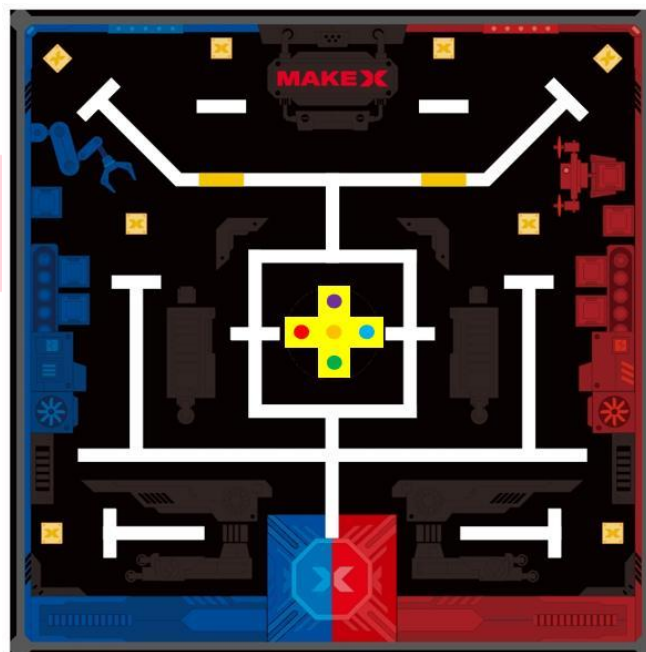


Diagram of the Upper Cubes



Diagram of the Lower Cubes

Mission Score: Successfully stacking cubes with the same color markers in the same



warehouse area gets 100 points.

Scoring Judging:

During the scoring time after each match, the following conditions will be used to determine the score:

- a. The warehouse area contains two layers of cubes, with the cubes on both the first and second layers having the same color markers.
- b. The bottom layer of cube completely cover the warehouse area's surface and is in direct contact with the ground, but not with the robot. The second-layer yellow cube is only in contact with the yellow cube that fully covers the warehouse area, not with the robot.

If the above conditions are met and two cubes with the same color markers are successfully stacked at the same warehouse area, the team will earn 100 points.

Mission NO.: M10

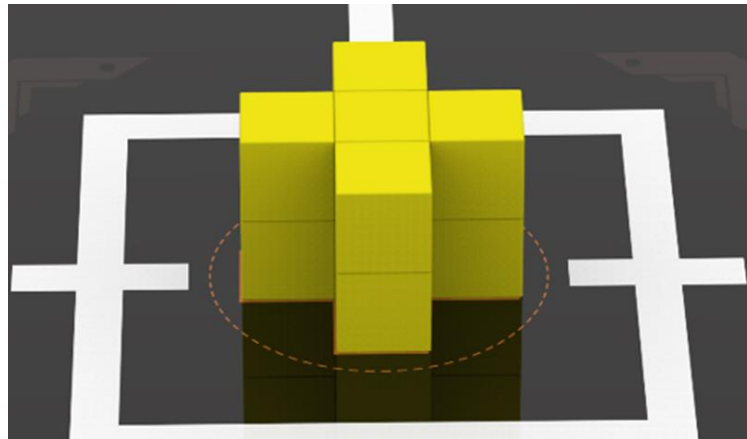
Mission Type: Automatic Mission

Mission target: The central center on the map contains 10 yellow cubes, each representing a transport box. The robot can be reset an unlimited number of times within 150 seconds. The countdown does not pause during resets. A reset must be requested by the referee, and the robot must not directly or indirectly contact the yellow cubes. The robot must completely remove the yellow cubes, which represent transport boxes, from the central center.

(Direct contact: Any part of the participant's body, including hair, hands, etc., or any items such as accessories or ID badges worn by the participant, in contact with objects on the field, is considered direct contact.

Indirect contact: If a participant physically interacts with the robot, and the robot then makes contact with an object on the field, it is considered indirect contact.)

Starting Condition: 10 transport cubes are located in the storage centre(central area) with 2 layers. Each layer has 5 cubes, placed as the "cross" sign.

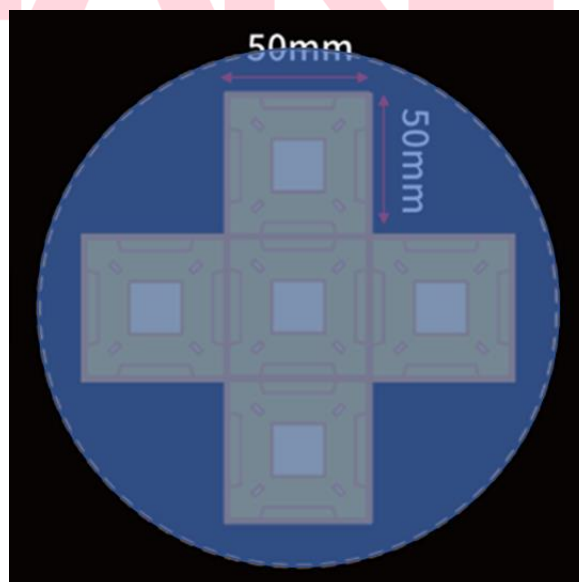


Mission Score: Each cube successfully removed from the central center earns 50 points.

Scoring Judging:

At the end of the competition, the yellow cubes must be completely outside the circular boundary of the central center, based on their vertical projection, and must not be in direct contact with the robot.

Area Description: The central center is the blue circular area shown in the image below, which corresponds to the circular dashed line in the center of the map.



Mysterious missions

During the 2024-2025 season, one mysterious mission will be released each quarter. Mysterious missions may include either automated or manual tasks. The specifics of the mission will be published on the MakeX Facebook official account (<https://www.facebook.com/MakeXofficial/>) and the competition guide before the competition, also will be explained in an announcement on site. Please stay updated. The types of mysterious missions in the competition include but are not limited to the following types.

Types of mysterious mission:

- (1) Fixed spot placement mission, there are 8 warehouse areas in the arena, each warehouse area will require a certain amount of cubes and other requirements.
- (2) Lifting up placement mission, robots will need to add the lifting devices to change the position of the yellow cubes.
- (3) Automatic program mission, which require the use of automatic program to complete the mission, after the start of the competition, contestants are not allowed to use Bluetooth controller.
- (4) Sorting and placing mission, there will be different colors of transport cubes, contestants are required to sort and place the cubes according to their colors.
- (5) Unique shape props mission, there will be cylinders, prisms and other different forms of three-dimensional props, contestants are required to place these props according to the requirements.

For the specific mission content, please refer to the announcement that release on-site.

4.5 Single Match Flow

The single match lasts for 150 seconds. The match flow is as follow:



Robot Inspection

Before each match, teams shall have their robot inspected. Referees will inspect the robot according to the technical requirement. The robot that passes the inspection will be able to continue to the competition, if the inspection fails, the result of the single



match will be zero, and the team will have to go back to the construction area to re-adjust.

Preparation

Before the single match, teams should arrive at the competing area ahead of schedule and prepare under the guidance of referee:

- (1) Power on the robot and place it completely in the starting area. If the team need to use the Bluetooth controller, powering on and placing it outside the arena.
- (2) Check the standard of arena and props placement.
- (3) Waiting for the referee's order

Competition Start

The competition begins after the referee's five-second counting down.

(1) Robot complete the mission. During the competition, teams are not allowed to restart or modify their robot.

(2) If the team applies to the referee to end the match before the match time, the referee gives the instruction of "over" and stops the timing, and the match will end ahead of schedule; when the 150 seconds run out, the referee will take the initiative to issue the command of "end of the match".

Except for safety issues, the contestants shall not apply to the referee for suspension of the match.

Referee's scoring and Contestant's Result Confirmation and Sign

The referee will count the scores after the competition. If there is no objection to the competition, the teams must confirm the match's result and sign on the score sheet. If there is any doubt about the result, the team may appeal to the referee without signing the score sheet.

After the confirmation of results, contestants shall actively assist the referee to restore the props, and leave the arena with their robots and Bluetooth controller in an orderly manner.

5. Technical Requirement

The Robot Requirements are prepared for better preparation for teams and ensure a



fair and safe competition standard. We suggest the team to programming and construct the robot under a fully comprehensive understanding of this guidebook. All robots must follow the Robot Requirements strictly and any against the requirement will be asked to rectify. The robot might be disqualified if seriously against the requirements.

Robot Mechanical Requirements

T01. Each team can use only one robot for inspection. After inspection, the team can only use the inspected robot for the match. The team should not replace the robot or use a robot which is not inspected.

T02. During the single match, the size of the robot shall not exceed the size of: length of 250mm, width of 200mm, and height of 200mm. The diameter of the wheel (including the rubber tires) shall not exceed 70mm.

A. Size of the robot is defined at the maximum extension state. Robots should be inspected when all moveable structures are in an extreme state.

B. When robot is at extreme state, any structure shall not exceed the size of length 250mm, width 200mm, height 200mm

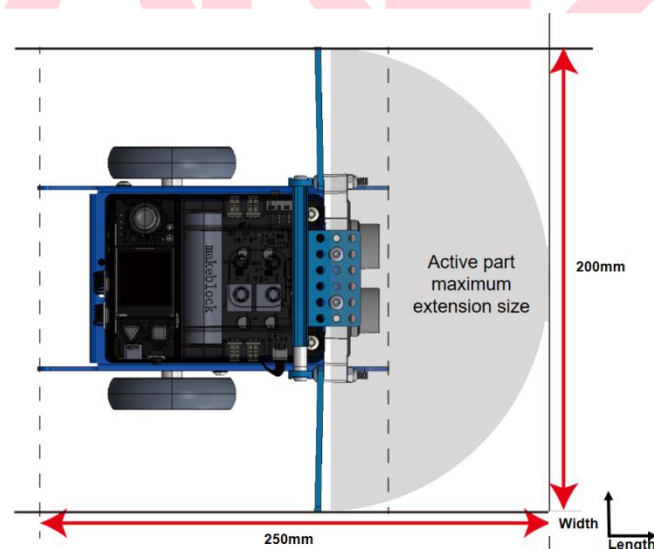


Fig5.1-1 Maximum extension state (Top View)

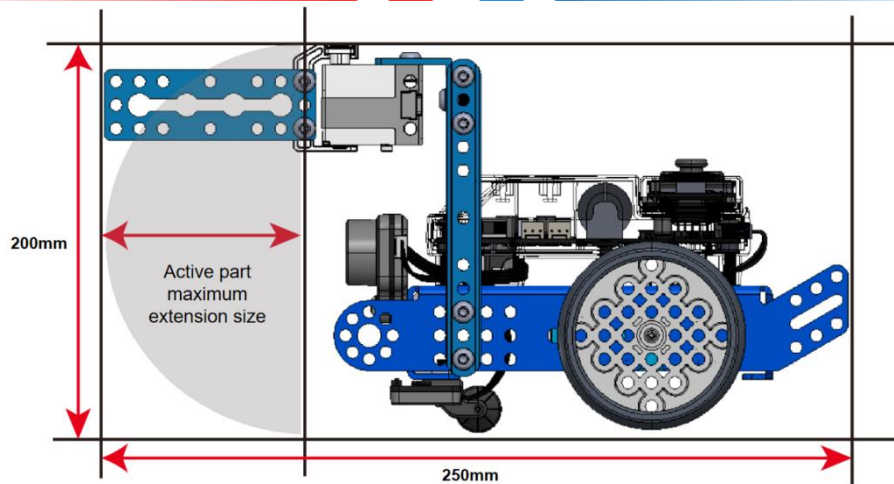


Fig 5.1-2 Maximum extension state (Side View)

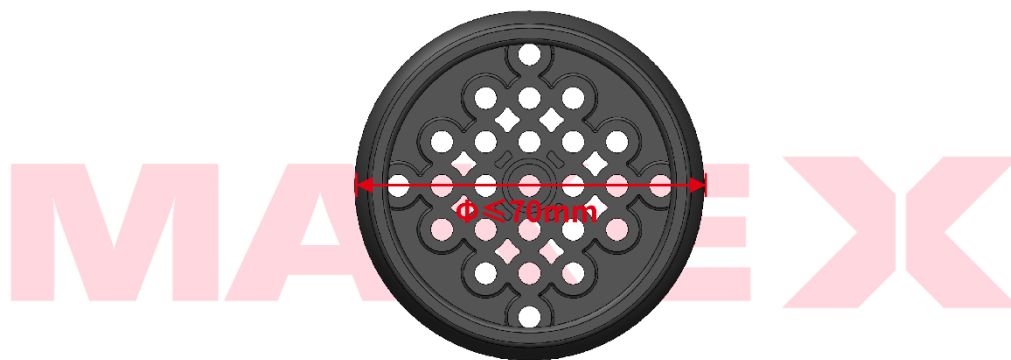


Fig 5.1-3 Wheel Size

T03. During the single match, robot weight should not exceed 2kg, including weight of battery.

T04. Teams can use self-made mechanical part, for example parts that made by 3D printing or laser cutting. Teams must not use commercial structures with mature design, including but not limit to multi-DOP robotic arms or hands.

Robot Electronic Requirements

T05. To ensure the fairness of competition and prevent teams from using high performance devices, teams should use devices with performance under the following given specification:

Device Type	Parts Name	Specs	Remark
Mainboard & Extension	ESP32-WROVER-B	Processor: Xtensa® 32-bit LX6 dual-core processor	During the whole competition, each



Board		Communication mode: wireless communication Serial communication: main control board to expansion board Digital signal: digital servo interface PWM: DC motor interface	team is only allowed to use the same main-board. For any special case, need applies to the referee.
Sensor	Vision Sensor	View angle: 65.0 degrees Valid focus: 4.65±5% mm Refresh rate: 60fps Working distance: Best in 0.25-1.2m Power Source: 3.7V lithium battery or 5V mBuild Power module Power range: 0.9-1.3W	Types and quantities are not limited. Robots are prohibited from using any sensors that can interfere with the sensory capabilities of other robots.
	Ultrasonic Sensor	Voltage: DC 5V Working distance: 5-300cm Error: ±5%	
	Line Follower	Voltage: DC 5V Working height: 5mm-15mm	
Motor & Servo Motor	Encoder Motor	180 Optical Encoder Motor Voltage: 12V Zero Load RPM: 350RPM±5% Gear Ratio: 39: 6	Must not modify any motor or servo internal mechanical and electrical design. Maximum total amount 5. Only motors and servos that mentioned in the rules are allowed to used
	Servo	MS-1.5 A Servo Voltage: 4.8-6V DC Torque: 1.5kg/CM	
Wireless	Bluetooth	Frequency: 2402~2480MHz	



Communication	Controller	Antenna Gain: 1.5dBi Working Current: 15mA	
	Bluetooth Module	Bluetooth Version: BT4.0 Frequency: 2402~2480MHz Antenna Gain: 1.5dBi Power: ≤4dBm Working Current: 15mA	Must not connect with any device other than Official Bluetooth Controller. Including but not limited to manually trigger sensor.
Battery	18650 Battery	Configuration: 3.7V 2500mAh Output: 5V 6A	Must not be modified. The team should be responsible for any accidents for the modification.

Robots should comply with technical requirements. Any violation will be disqualified from the competition and the team must modify the robot until matches the requirements.

6. Rules of Competition

6.1 Penalties explanation

Explanations and categorization of rules are defined in the following sections:

Warning

E01. The Referee gives the team an oral notice of the first violation and asked the team to stop the violation and obey the referee's instructions. During the warning, the competition will be timed normally.

Violation

E02. The referee immediately announced the violation to the team and deducted 20 points from the team as soon as it found a violation (the team had been warned once before in this single match). During the violation, the competition will be timed



normally.

E03. During the competition, if any scoring advantages are obtained because of the violation behaviour, the scoring advantages are invalid, and the scoring props will become invalid props.

Invalid Prop

E04. From the moment that non-compliant contact with the mission prop and scoring prop, it will trigger the invalid prop and the referee will announce the props are invalid props. The invalid props will be removed from the arena by the referee and cannot continue to get points. The Referee has the right to determine whether the final state of the prop before invalid can be scored or not according to the contents of this Guide. At the scoring time, if the prop is in contact with the robot directly, the prop can not be scored.

Disqualify Single Match

E05. During the match, the team violated the rules, resulting in invalidation of the score of the match, but did not affect another match.

Disqualify Entire Competition

E06. The team will lose the opportunity to continue to participate in the competition and the right to award.

6.2 Safety

Robot Safety

R01. The team's design and construction for the robot should follow the technical requirements.

R02. The robot's parts should be used safely.

R03. The robot should not behave in any active behaviour of parts separation (bouncing or shooting parts).

R04. During the competition, the robot should not use any sticky material (including but not limited to double-sided tape or glue).

R05. The referee has the right to reject a dangerous robot for competition. The referee has the right to withdraw a team from the rest of the competition depending on the



dangerous level of the robot.

Team's Safety

R06. Under the guidance of the mentor and after reading this guide, contestants can proceed to prepare for the competition and to design and construct their robot.

R07. In the preparation process, the team must not perform any dangerous actions.

R08. The Team should pay attention to safety when using dangerous tools (screwdrivers, sharp knives).

R09. During the competition, teams are suggest to wear goggles; long hair should be tied up; teams are prohibited from wearing slippers into the competition arena.

R10. During the competition, teams should not press the arena heavily or any behaviour like damage the arena or props.

The referee has the right to reject teams that do not conform to the safety rules entering the competition arena. The Referee has the right to disqualify a team for the entire competition according to the level of danger.

6.3 Operation Rules

Robot Start in Advance

R11. Contestants must start the robot after the referee announces the start of the competition. If the robot is moved in advance, the robot is started in advance.

- Penalty for this behavior: Violation.

Wireless Remote-Control Operation

R12. Contestants are not allowed to bring electronic communication devices (cellphones, intercom, computers, or any other wireless remote devices) into the competing area.

- Penalty for this behavior: Warning. The team can be disqualified from single match if serious

Contestant standing position

R13. Contestants are allowed to operate their robots around the perimeter of the competing area.

Non-compliance with programming tools

R14. Contestants are not allowed to bring computers, Tablet PC or any other



programming devices into the competing area.

- Penalty for this behavior: The team can be disqualified from single match if serious.

Violation Due to Contact with the Robot

R15. During the competition, contestants are strictly prohibited from directly or indirectly contacting robots.

- Penalty for this behavior: Violation. The team can be disqualified from single match if serious.

Violation Due to Contact with the Props

R16. During the competition, contestants are strictly prohibited from directly or indirectly contacting the props.

- Penalty for this behavior: Violation. The prop will be invalid and removed from arena by referee.

Deliberately pressing or hitting the Arena

R17. During the competition, contestant should not deliberately press or hitting the arena for scoring advantage.

- Penalty for this behavior: Violation. Points or advantage that due to this violate behavior will be invalid.

Destroy arena elements on purpose

R18. During the competition, contestants and robots are not allowed to destroy the arena elements on purpose.

- Penalty for this behavior: Violation

Scoring Props Leaving Arena Violation

R19. In the whole process of single match, the vertical projection of scoring prop should not leave the arena. Otherwise, the prop is invalid and removed from the arena.

Robot Leaving Arena Violation

R20. In the whole process of single match, the vertical projection of robot should not leave the arena.

- Penalty for this behavior: Violation

Violation Due to Mentoring



R21. During the whole process of the competition, including the robot construction and debugging time, the team should not have any external mentoring.

- Penalty for this behavior: Warning for the first time, violation for the second time. The team can be disqualified from single match if serious.

Egregious Behaviors

R22. It will be regarded as Egregious Behaviors if a team or a person related with the team incurs into, but not limited to, any of the following circumstances. In case of Egregious Behaviors happens, the referee has the right to disqualify entire competition.

- Impolite behaviors (abuse, bad words, unnecessary physical contact).
- Seriously affecting the competing area and the safety of the audiences. Interfering the process of competition.
- Seriously violating the spirit of competition (e.g., cheating).
- Repeated violations or ignoring the Referee's warning, violating blatantly.
- Malicious Complaints

Abnormal Situation

R23. Including but not limited to following situation:

- Potential Safety Risk: The competition venue emerges problems that might affect the safety of competing areas, teams or robots.
- Damage or missing of arena elements and props: The arena and its elements and props are damaged or missing accidentally which leads to the competition not continuing.
- Re-competition: Referees have the right to discuss and determine if a Re-competition is necessary according to the specific situation.

The uncertainty of arena, props

R24. Due to the uncertainty of manufacturing and processing, all arenas and props may exist minor error (dimension, weight, color and flatness, etc.). Teams should take these minor errors into consideration when constructing their robots to adapt different props and arenas. Contestants can apply to change the props before the competition if there are some adaptable props available. Robots should be able to adapt some unchangeable elements such as folded arena, light change, etc., The team



should debug their robot to adapt these unchangeable elements.

Quitting competition due to sudden situation

R25. After on-site registration, if the team cannot continue to participate in the competition due to some sudden situation, the team has to report to MakeX Committee and the competition schedule that is related to the team will proceed as normal.

Unexpected withdrawal from the competition

R26. If a team is unable to continue competing due to force majeure after check-in, the team must report the reason for withdrawal to the MakeX competition committee.

7. Appeal and Arbitration

7.1 Results Confirmation

Results Confirmation

When a single match ends, after the referees finish the scoring, the captains of both teams need to confirm the results with the referees and then sign on the score sheet. Both teams shall not have any objection to the results of this single match after their signatures.

Dispute Settlement

If have any objection to the results and referee's explanation, they can reject to sign the score sheet. Instead, they need to write clearly about the situation on the remarks part of the score sheet.

7.2 Appeal Procedure and Valid Appeal Period

Appeal Procedure

Appeals should be lodged within the “valid appeal period” by the prescribed procedure and follow the civil participation spirit. The team needs to fill in the Appeal Form, and then cooperate with the Arbitration Commission to investigate the actual situation. During the investigation, contestants of the team can be present. The Arbitration Commission has the right to communicate with the appealing party alone, avoiding the mentor, the parents of the contestants, their relatives, or friends. The appellant should express facts clearly and objectively, not over-emotionally.



Valid Appeal Period

Normally, the appeal should be lodged within 30 minutes after the end of the single competition. Please check the Competition Guide for a specific effective appeal period before the competition. The appellant and the respondent must be present at the designated place on time.

Appeal Response

Not all appeals will be accepted. The Arbitration Commission has the right to determine whether to accept the appeal or not according to the actual situation. Normally, the Arbitration Commission responds to the appeal after the end of the competition on the same day or before the start of the competition on the next day.

7.3 Invalid Appeal

Overdue Appeal

Appeals that are not lodged within the "valid appeal period" will be considered invalid and inadmissible. If the appellant fails to be present on time or leaves without any reason during the investigation, the appeal will be considered invalid. If the respondent fails to be present on time, the Arbitration Commission will directly determine the arbitration result and render it as a final result.

Appellants out of Stipulation

The appellants must be the participating contestant and the appeal of another person is inadmissible. The Arbitration Committee will caution the offending team if parents, mentors, or other persons out of the stipulation participate in the arbitration process without the permission of the Arbitration Committee.

- Penalty for this behavior: Warning for the first time, a disqualification will be given for multiple invalid warnings.

Vague Appeal's Requests

If the Arbitration Commission is unable to understand the appeal or conduct the normal investigation due to the emotional factors of the appealing party, the offending party will receive a verbal warning.

- Penalty for this behavior: Warning for the first time, a disqualification will be given for multiple invalid warnings.

Uncivil Appeal

Neither side shall make uncivil behavior nor offensive action and remarks.



- Penalty for this behavior: Warning for the first time, a disqualification will be given for multiple invalid warnings.

7.4 Arbitration Procedure

Arbitration Procedure

The Arbitration Commission consists of the head referee, the arbitration consultant, and the competition technical director. The Arbitration Commission is responsible for accepting the appeals and conducting arbitration investigations, to ensure the smooth progress of the competition and the fairness and justice of the competition results. The playback videos and photographs of any competition may be inaccurate due to the shooting angle, which is only used as reference but not arbitration evidence.

Arbitration Results

The arbitration results can be divided into “maintaining the original result of the match” or “re-match”, and the two teams shall not appeal again. If the arbitration result is a "re-match", the team shall have a re-match according to the time and arena stipulated in the Appeal Form. If the team fails to reach the arena within 5 minutes after the beginning of the match, the team shall be deemed to quit the match.

The arbitration results can be divided into “maintaining the original result of the match” or “re-match”, and the two teams shall not appeal again. If the arbitration result is a "re-match", the team shall have a re-match according to the time and arena stipulated in the Appeal Form. If the team fails to reach the arena within 5 minutes after the beginning of the match, the team shall be deemed to quit the match.

Additional Remarks

The Arbitration Commission determines the final arbitration result, and neither side shall dispute the result of the appeal anymore.

8. Statement

The MakeX Robots Competition Committee reserves the final interpretation of MakeX Robots Competition - Rules Guide for MakeX Inspire - Smart Logistics.

8.1 Rules Explanation

In order to ensure fair competition and a high-quality competition experience, MakeX



Robotics Competition Committee has the right to update and complement this Rules Guide regularly, and issue and implement the latest version before the competition. During the competition, all matters not stated in the Rules Guide shall be decided by the referee team.

This Rules Guide is the basis for refereeing, and the referee team has the right to adjudicate during the competition.

8.2 Disclaimer

All Contestants in MakeX Robotics Competition should fully understand that safety is the most important issue for the sustainable development of MakeX Robotics Competition. To protect the rights and interests of all contestants and organizers, according to relevant laws and regulations, all contestants registered for the MakeX Robots Competition, should acknowledge and abide by the following safety provisions:

- (1) Contestants should take adequate safety precautions when constructing the robots, and all parts used for constructing the robots should be purchased from legal manufacturers.
- (2) Contestants should ensure that the structural design of the robots takes into account the convenience of the inspection and actively cooperate with the host of the competition.
- (3) When modifying and using the parts with potential safety hazards for the Robots, it must conform to the national laws, regulations and quality & safety standards. Those operations should be manufactured and operated by persons with relevant professional qualifications.
- (4) During the competition, the teams should ensure that all the actions such as construction, testing and preparation will not do harm to their own team and other teams, referees, staff, audiences, equipment and arenas.
- (5) In the process of construction and competition, if any action that may violate the national laws, regulations or standards occur, all consequences will be borne by the contestants themselves.

The competition kits and parts sold and provided by the supporter, Shenzhen Makeblock Co., Ltd., shall be used by the instructions. Shenzhen Makeblock Co., Ltd. and MakeX Robotics Competition Committee will not be responsible for any injury or loss of property caused by improper use.



8.3 Copyright Declaration

Shenzhen Makeblock Co., Ltd. reserves the copyright of this Rules Guide. Without the written consent or authorization from Shenzhen Makeblock Co., Ltd, any entity or individual may not reproduce, including but not limited to any network media, electronic media or written media.

MAKE X



Appendix 1: Awards and Annual Points

In order to properly guide participants to experience and reap the spirit of the MakeX Robotics Competition: create, collaborate, fun, share, a series of awards are set for this competition program. The award categories, which may be updated during the competition season, are as follows:

Champion, Runner-up, Second Runner-up

Champion, Runner-up and Second Runner-up winners are selected based on the competition results of the qualification rounds.

Innovative Design Award

The Innovative Design Award is given to the team whose robot is creative, innovative, and artistic. MakeX Committee encourages teams to break the shackles of thinking, show their robots of unique design and structure, and create a perfect fusion of aesthetics and technology with their own hands.

Judging Dimension:

- (1) The appearance design of the robot is unique, fully displaying the characteristic, multicultural, and the likes of the ornamental elements.
- (2) The robot is scientific and reasonable in structural design. Achieve innovative breakthroughs in function realization and structural arrangement.

*For more detail judging dimension, please refer to the MakeX Award Guide.

Appendix 2: Robot Self-check form

MakeX Inspire - Smart Logistics

Robot Self-check Form

Please follow the requirements of the self-checklist and check the box if your robot meets the requirements. And submit the signed self-checklist during the inspection day. Thanks for your cooperation.

Team Name: _____ Mentor Name: _____
 _____ Team Member: _____

1. Basic Information
Robot Mainboard Number: _____ (A 12-bit code consist of numbers and alphabet, please find from the CyberPi)
Robot wheel size: _____ mm diameter (not exceeding 70 mm)
2. Equipment
Name and quantity of sensors:
Name and quantity of motors:
Name and quantity of servos:
Wireless control: Version of Bluetooth: BT4.0 <input type="checkbox"/> Yes
Name and parameters of battery: (18650 Lithium-ion batteries, 3.7V 2500mAh) <input type="checkbox"/> Yes
3. Structural parts
Quantities of structural parts (not included screws, nuts, rivets, etc.):

Our team has filled in the actual data on this form and completed the self-check accordingly and confirmed that all equipment and parts are all meet the inspection and participation requirements. We promise that no more parts and equipment will be added after we submit this form. If there are any actions that does not comply with the requirement or our team uses any in-compliance robot, the competition result will be disqualified and all responsibilities will be taken by the team without objection.

Team Leader Signature:

Date:



Appendix 4: Competition Resources

Competition resources include but are not limited to official resources provided by the committee, such as Competition Guide, Equipment Instructions, Rules Videos, etc.

The contestants are obliged to keep abreast of the update of competition resources before the competition, and any problems caused by the contestants' failure to keep abreast of the updates shall be borne by the contestants themselves. All official competition resources will be updated in MakeX Website.

MakeX Robotics Competition Committee will revise and improve the Rules Guide with the progress of the competition and the new version will be announced in

MakeX Website. The contestants and mentors can download the latest version in MakeX Website.

MakeX Website Download <https://www.makex.cc/en/information/download>.

MakeX Official Website: <https://www.makex.cc/en>.

Any Feedback & Question Please Sent to: makex_overseas@makeblock.com

MAKEX

Edited By Makex Robotics Competition Committee

RULES GUIDE

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