

V1.2

Using a BL-M motor driver chip and Field-Oriented Control (FOC), the RoboMaster 2020 Bramble DC Motor Speed Controller enables precise control over motor torque.



Exclusively designed for the RoboMaster 2020 Bramble DC Motor and 2020 Bramble DC Motor Speed Controller, this 450mAh Accumulator Kit includes several cables and a terminal board.

Reference System Specification Manual, Reference System User Manual, Introduction of Reference System Module



Kit M009 Assembly Kit includes several cables and a terminal board, ensuring a complete propulsion system setup by your RoboMaster team.



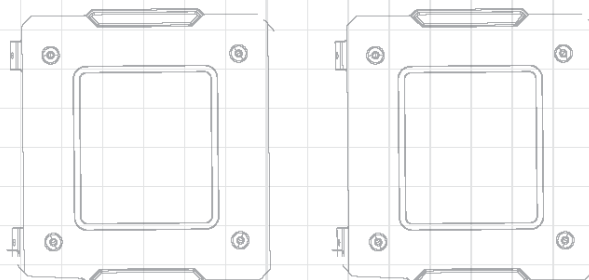
ROBOMASTER

ROBOMASTER 2020

TECHNICAL CHALLENGE

PARTICIPANT MANUAL

Prepared by the RoboMaster Organizing Committee
Released on March, 2020



Statement

Participants are forbidden to be engaged or participate in practice suspected of public dispute, sensitive issue, offending the public or certain mass groups or other behaviors that damage the RoboMaster image; otherwise, once confirmed by the RoboMaster RMOC (hereinafter referred to as "the RMOC"), the offending party will be disqualified for the RoboMaster Competitions permanently.

Using this Manual

Legend

 Prohibition	 Important notes	 Hints and tips	 Definition and reference
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Release Notes

Date	Version	Changes
2020.03.23	V1.2	<ol style="list-style-type: none"> Adjust Season Schedule. Adjust the number of Pit Crew in 2V2 Confrontation. Add new rules for participating teams and participants. Add Safety Instruction.
2020.01.03	V1.1	<ol style="list-style-type: none"> Update Platform for Communication and Q&A. Update selection rules for Open Source Award. Add new items and selection criteria to Outstanding Contribution Awards. Update Appendix 1 Technical Assessment.
2019.10.31	V1.0	First Release

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1. Introduction

Founded by SZ DJI Technology Co., Ltd. and designed for young engineers, RoboMaster is a global educational robotics program that includes events, campus clubs, and pop-culture spinoffs. The RoboMaster Competition is China's first FPV (First-Person View)-shooter-based robotics competition. It requires participants to go beyond their textbooks to develop a diverse fleet of robots. Through a process of independent research and development, students gain invaluable industrial practice and strategic planning skills. This helps to combine their book knowledge with practice in this field. The most advanced and intelligent robots are built through intense competition and relentless improvement.

The RoboMaster Competition is a global competition that technology enthusiasts from all over the world can enjoy and take part in. It is committed to increasing the visibility of robotic competition and engineers in the public, and inspiring individuals or groups to pursue their dreams in tech and join in the ranks of tech innovators.

RoboMaster is revolutionizing the way university tech talent is nurtured. On top of promoting robotic tech development, it is also building a comprehensive sharing platform for competition participants. Through competitions and practical experience, they are able to grow, improve, and pursue their dreams of ultimately changing the world.

2. Season Schedule



The following is the RoboMaster 2019 Robotics Season Schedule for reference only. The specific time is subject to the latest announcement by the RMOOC.

RoboMaster Robotics Competition is set under RoboMaster Competition. The RoboMaster 2020 Robotics Competition (hereinafter referred to as “RM2020 Robotics Competition”) consists of online schedule and offline schedule. It is recommended that each team drafts out a 2020 Season Schedule to evaluate its personnel and funding needs. Teams are also advised to stick to a budget when making their robots at the beginning of the preparation stage.

Teams that complete the registration and pass the Technical Assessment qualify for the Final Tournament. For details about Technical Assessment specifications, please refer to [Appendix 1 Technical Assessment](#). Teams registering for the Technical Assessment can get a [RoboMaster 2020 Instructions for Purchasing Materials](#).

Table 2-1 Online Schedule

Schedule	Competition	Property	Entry Qualification
12 p.m., October 15, 2019 - 12 p.m., November 15, 2019	Registration on Official Website	Teams from Mainland China; Teams from Hong Kong, Macao, Taiwan and Overseas	Log in the RoboMaster website and complete the registration as required.
12 p.m., April 3, 2020 - 12 p.m., April 4, 2020	Technical Assessment - Referee System Exam	Teams from Mainland China; Teams from Hong Kong, Macao, Taiwan and Overseas	Qualify for submitting the Final Robot Assessment Video
12 p.m., May 12, 2020 - 12 p.m., May 14, 2020		Teams from Mainland team	Obtain loaner access for the participating robots' referee systems and qualification for the (Chinese) regional competition.

Schedule	Competition	Property	Entry Qualification
12 p.m., June 8, 2020 - 12 p.m., June 10, 2020	Technical Assessment - Final Robot Assessment Video	Teams from Hong Kong, Macao, Taiwan and overseas	Obtain loaner access for the participating robots' referee systems and qualification for the final tournament.

Table 2-2 Offline Schedule

Schedule	Competition	Property	Entry Qualification
July 2020 – August 2020	Final Tournament	Teams from Mainland China	Teams that rank higher in regional competitions qualify for the Final Tournament.
		Teams from Hong Kong, Macao, Taiwan and overseas	Directly qualify for the Final Tournament.
May 2020 – June 2020	Regional Competitions	Teams from Mainland team	<ul style="list-style-type: none"> Teams from Mainland China that pass Final Robot Assessment Video qualify for the regional competition. Teams from Mainland China are free to choose the division or accept the arrangements made by the RMOC. The priority in choosing the division is based on the rankings of the total score of Technical Assessment.

3. Participation

There are three types of team: teams from Mainland China, teams from Hong Kong, Macao, Taiwan and Overseas and Chinese and Foreign Joint Teams. The Chinese and Foreign Joint Teams determine their property and entry procedure according to the geographical location of the school.

3.1 Participants

The RoboMaster Competition advocates teamwork and encourages participating members to actively take on important roles within the team. The RMOC will select Outstanding Captains, Outstanding Supervisors and other awards to recognize the participants who have made positive contributions to the RoboMaster event. Please refer to the table below for the roles and responsibilities of the participants:

Table 3-1 Participants' Roles and Responsibilities

Roles	Role Instructions	Qty.	Status	Responsibilities
Supervisor	<ul style="list-style-type: none"> The main supervisor of the team is responsible for the formation and management of the team Responsible for guiding the team in making the robot Cannot serve as Advisor or team member at the same time 	1-5	As regards the institutions of higher education who produce graduates before August 2020, they must already employ faculty with qualifications for research and teaching (if necessary, you need to produce relevant evidence at the competition site)	<ul style="list-style-type: none"> Responsible for the personal and property security of the team Coordinating on-campus resources, guide the team in developing project plans, controlling preparation progress, help the team successfully conclude the match During the matches, the Supervisor must actively cooperate with the work of the RMOC

Roles	Role Instructions	Qty.	Status	Responsibilities
Advisor	<ul style="list-style-type: none"> ● Team Advisor ● Cannot serve as Supervisor or team member at the same time 	0-5	Full-time junior college students, undergraduates, postgraduates, and doctoral students in colleges and universities, as well as engineers, researchers and faculties working in enterprises, research institutions, or freelancers	<ul style="list-style-type: none"> ● Provide guidance and support to the team on strategy, technology, management, etc. ● Advisor can undertake tasks of manufacturing robots and other competition affairs
Team Member	<ul style="list-style-type: none"> ● Including Captain, Project Manager and General Member, see the table below for details ● Cannot simultaneously assume the roles of Advisor and Supervisor 	Meet the requirements stated in Table 3-3	Full-time junior college students, undergraduates, postgraduates, and doctoral students in colleges and universities learning with proof of school enrollment before August 2020	See the table below for details

Table 3-2 Regular Members' Roles and Responsibilities

Roles	Role Instructions	Qty.	Responsibilities
Captain	<ul style="list-style-type: none"> ● Core team member, the team's technical and tactical leader 	1	<ul style="list-style-type: none"> ● Responsible for division of labor, overall planning and tactics arrangement and adjustment

Roles	Role Instructions	Qty.	Responsibilities
	<ul style="list-style-type: none"> The main liaison of the RMOC Cannot serve as Project Manager 		<ul style="list-style-type: none"> Attend Captains Meeting, represent the team to confirm match results and participate in appeal processes and any subsequent hearings Responsible for the legacy and development of the team after the competition
Project Manager	<ul style="list-style-type: none"> Core team member Overall manager of the project 	0-1	In charge of sorting out project tasks, coordinating fund, materials, personnel and other resources, helping establish sound team management regulations and institutions, planning and managing the overall project subjects (including goals, progress, costs, etc.)
General Member	Assumes none of the above roles	Meet the requirements stated in Table 3-3 .	-

Table 3-3 The Number of Team Members in Each Challenge



Challenge	Number of Team Member	Number of Pit Crew
Engineer Projectile Obtaining	3-8	3
Standard Racing and Smart Firing	2-5	3
2V2 Battle	3-10	4 (including Projectile Supplier)
Dart Targeting	2-5	4

3.2 Participating Team

Below shows the definition, rights and entry procedures for each type of team.

Table 3-4 Types of Participating Teams

Teams from Mainland China	
Definition	Pass the registration review within the specified period in order to meet the relevant competition entry requirements and geographically located in mainland China.

Entry Rights	Qualified for the 2020 Season competitions, awards application and promotion.
Entry Procedures	<ol style="list-style-type: none"> The event procedure is carried out in accordance with the standards for teams from Mainland China. <hr/> <div style="display: flex; align-items: center;">  <p>The event procedure includes material gifts, purchases, and participation support.</p> </div> <hr/> <ol style="list-style-type: none"> Teams that participate in regional competitions and perform excellently are promoted to Final Tournament.
Teams from Hong Kong, Macao, Taiwan and overseas	
Definition	Pass the registration review within the specified time, the participating teams from Hong Kong, Macao, Taiwan and overseas regions meet the relevant entry requirements.
Entry Rights	<p>Qualified for the 2020 Season competitions, awards application and promotion.</p> <hr/> <div style="display: flex; align-items: center;">  <p>As regards Hong Kong, Macao and Taiwan and overseas teams, due to their different education systems, team members with high school education are allowed to participate in the competition, but the proportion must not exceed 20% of the total number of team players.</p> </div>
Entry Procedures	<ol style="list-style-type: none"> The event procedure is carried out in accordance with the standards of Hong Kong, Macao, Taiwan and overseas teams. Directly enter Final Tournament.
Chinese and Foreign Joint Teams	
Definition	Pass the registration review within the specified period, the participating teams from Hong Kong, Macao and Taiwan and overseas jointly-run universities that meet the relevant entry requirements.
Entry Rights	Qualified for the 2020 Season competitions, awards application and promotion.
Entry Procedures	<ol style="list-style-type: none"> If the school's geographical location is in Mainland China, its team is subject to the event procedure in accordance with the standards for teams from Mainland China. If the mainland school forms a team with teams whose universities are located in China Hong Kong, Macau, Taiwan and overseas, the team is subject to the entry procedures in accordance with the standards for teams from Hong Kong, Macao,

Taiwan and overseas. Chinese and Foreign Joint Teams should meet the requirements stated in R4 in 3.3 Others .
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3.3 Others

Participating teams must adhere to the following rules when forming their teams:

- R1. A participating team must be attached to a university or college, and must meet the role, number and identity requirements for personnel stated in [3 Participation](#).
- R2. For each institution of higher learning participating in the competition, only one team representing the institution is allowed to register for each challenge. In other words, multiple teams from one institution can register for four challenges, but they must follow the "Five Different Principles", which are different team name, different team members, different supervisors, different affiliated organizations (e.g. school of the college) and different participating robots.
- R3. The team name must be in the format of "XXX-Team" ("- " is only a separator and should not appear in the actual team name). "XXX" should be the team name chosen by the team itself. The total length of the team name should not exceed 16 English letters or 8 Chinese characters. The team name must not include the school name or its abbreviation in Chinese/English, or such Chinese characters as “队”, “团队” and “战队” which mean "team" in English, or other special symbols such as “*/-+”. The team name must reflect the positive and pioneering spirit of the team and comply with relevant state laws and regulations.
- R4. Any two to five schools that do not have their own individual teams can form an intercollegiate team.
- R4.1 Before establishing an Intercollegiate Team, members must consider all their respective circumstances and communicate with each other thoroughly about team planning. Any operating and R&D costs, personnel arrangements or disputes arising therefrom must be handled by the Intercollegiate Team itself, for which the RMOC bears no responsibility.
- R4.2 After an Intercollegiate Team has been established, it can only participate in the RoboMaster 2020 Technical Challenge in the name of the Intercollegiate Team. If an Intercollegiate Team is disbanded, the team will be deemed to have voluntarily dropped out of the competition.
- R4.3 After an Intercollegiate Team has been established, it can only participate in the RoboMaster 2020 Technical Challenge in the name of the Intercollegiate Team. If an Intercollegiate Team is disbanded, the team will be deemed to have voluntarily dropped out of the competition.

R4.4 The registered team name shall be “Intercollegiate Team” instead of “Team”. An Intercollegiate Team Statement must be issued by the universities or colleges represented by the Intercollegiate Team, and must be submitted to the registration system. Refer to the registration system for the template of the Intercollegiate Team Statement.

R4.5 For an Intercollegiate Team consisting of Hong Kong, Macau, Taiwan and overseas team members, if more than 50% of the total number of regular team members are formal team members from Hong Kong, Macau, Taiwan and overseas, the Intercollegiate Team shall be categorized as a Hong Kong, Macau, Taiwan and Overseas team and directly participate in the Final Tournament. Otherwise, the Intercollegiate Team shall be categorized as a Mainland China team and must participate in the China Regional Competition.

R5. Any participating team member can only participate in one team during the RoboMaster 2020 Technical Challenge period.

Penalties:

- The RMOC will reject the registration of any team that does not meet any of R1-R4. The registration can be resubmitted after the team has amended it to meet the requirements.
- If any member of a team does not meet the identity requirements stated in R1, a Verbal Warning will be given to the team. If the Verbal Warning is ineffective, according to the seriousness of the situation, the highest penalty that can be given to the offending party is disqualification.
- If R5 is not met, the highest penalty that can be given to the offender and offending team is disqualification.

3.4 Platform for Communication and Q&A

The RMOC provides many Q&A channels as shown below. For more contact information, please refer to RoboMaster Organizing Committee Official Contact Details and FAQ Rules.

Table 3-5 Platform for Communication and Q&A

Channel	Office Hour	Notes
Official Forum: bbs.robomaster.com	Office hour: 10:30-12:30, 14:00-19:30 on weekdays	-
Email: robomaster@dji.com		-
Tel: 0755-36383255		-
QQ: 2355418059		When sending a friend request, please write down "Specific competition + college name + role + name"
WeChat: rmsaiwu		

4. Award System

4.1 Final Tournament



- The name of the award will be adjusted later, subject to the actual certificate issued.
- The number of prizes of each challenge is subjected to the actual number of qualified teams. The number of First Prize is no more than 10% of the total participating teams in principle. For the actual number, please pay attention to the latest version of Participant Manual released by the RMOC.

Awards of 2V2 Confrontation of the Final Tournament are as follows:

Table 4-1 2V2 Confrontation Awards

Award	Ranking	Qty.	Reward
National First Prize	Champion: 1st place	1	<ul style="list-style-type: none"> ● Champion trophy ● First Prize Honorary Certificate ● 5000 RMB (pre-tax)
	First Runner-Up: 2nd place	1	<ul style="list-style-type: none"> ● First runner-up trophy ● First Prize Honorary Certificate ● 5000 RMB (pre-tax)
	Second Runner-Up: 3rd place	1	<ul style="list-style-type: none"> ● Second runner-up trophy ● First Prize Honorary Certificate ● 5000 RMB (pre-tax)
	4th place	1	<ul style="list-style-type: none"> ● First Prize Honorary Certificate ● 5000 RMB (pre-tax)
National Second Prize	-	Multiple	Second Prize Honorary Certificate
National Third Prize	-	Multiple	Third Prize Honorary Certificate

The below table of awards is applicable to Engineer Projectile Obtaining, Standard Racing and Smart Firing and Dart Targeting of the Final Tournament:

Table 4-2 Non-2V2 Confrontation Awards

Award	Qty.	Reward
National First Prize	Multiple	<ul style="list-style-type: none"> ● First Prize trophy

Award	Qty.	Reward
		<ul style="list-style-type: none"> ● First Prize Honorary Certificate ● 5000 RMB (pre-tax)
National Second Prize	Multiple	Second Prize Honorary Certificate
National Third Prize	Multiple	Third Prize Honorary Certificate

4.2 Regional Competition

The number of prizes of each challenge is subjected to the actual number of qualified teams.



The number of First Prize is no more than 10% of the total participating teams in principle. For the actual number, please pay attention to the latest version of Participant Manual released by the RMOC.

Awards of 2V2 Confrontation of the China Regional Competition are as follows:

Table 4-3 2V2 Confrontation Awards

Award	Ranking	Qty.	Reward
Regional Competition First Prize	Champion: 1st place	1	<ul style="list-style-type: none"> ● Champion trophy ● First Prize Honorary Certificate ● 3000 RMB (pre-tax)
	First Runner-Up: 2nd place	1	<ul style="list-style-type: none"> ● First runner-up trophy ● First Prize Honorary Certificate ● 3000 RMB (pre-tax)
	Second Runner-Up: 3rd place	1	<ul style="list-style-type: none"> ● Second runner-up trophy ● First Prize Honorary Certificate ● 3000 RMB (pre-tax)
	4th place	1	<ul style="list-style-type: none"> ● First Prize Honorary Certificate ● 3000 RMB (pre-tax)
Regional Competition Second Prize	-	Multiple	Second Prize Honorary Certificate
China Regional Competition Third Prize	-	Multiple	Third Prize Honorary Certificate

The below table of awards is applicable to Engineer Projectile Obtaining, Standard Racing and Smart Firing and Dart Targeting of the China Regional Competition:

Table 4-4 Non-2V2 Confrontation Awards

Award	Qty.	Reward
Regional Competition First Prize	Multiple	<ul style="list-style-type: none"> ● First Prize Honorary Certificate ● 3000 RMB (pre-tax)
Regional Competition Second Prize	Multiple	Second Prize Honorary Certificate
China Regional Competition Third Prize	Multiple	Third Prize Honorary Certificate

4.3 Open source Award

- There is no fixed number of open source awards, and the RMOC will rank them according to the quality of the submitted projects. For example, if all open source projects are not particularly outstanding, the first prize of the Open Source Award shall have no winners; if there are multiple outstanding players, one winner of the first prize of multiple open source awards can be selected.



- The team that won the Champion, First Runner-up and Second Runner-up in the Final Tournament must follow the specification to open source robots that are specified by the RMOC, otherwise it will affect the issuing of the Final Tournament cash prize. The RMOC will add more Open Source Awards depending on the actual open source situation.

The awards of the Open Source are as follows. For selection, please refer to [Appendix 2 About Award Selection](#).

Table 4-5 Open Source Awards

Award	Qty.	Reward	Notes
Open Source Grand Prize	Multiple	<ul style="list-style-type: none"> ● Honorary Certificate ● USD \$ 15,000 (pre-tax) 	
Open Source First Prize	Multiple	<ul style="list-style-type: none"> ● Honorary Certificate ● USD \$ 7,500 (pre-tax) 	
Open Source Second Prize	Multiple	<ul style="list-style-type: none"> ● Honorary Certificate ● USD \$ 4,500 (pre-tax) 	

Award	Qty.	Reward	Notes
Open Source Third Prize	Multiple	<ul style="list-style-type: none"> Honorary Certificate USD \$ 1,500 (pre-tax) 	In the RM2020 season (September 20, 2019 to August 31, 2020), the core technologies operation management approaches were publicly shared in the RoboMaster BBS and on the official website to promote the development of the RoboMaster Robotics Competition and the culture and spirit of engineers.
Open Source Outstanding Prize	Multiple	<ul style="list-style-type: none"> Honorary Certificate Grade A: USD \$ 750 (pre-tax) Grade B: USD \$ 450 (pre-tax) Grade C: USD \$ 300 (pre-tax) 	

4.4 Outstanding Contribution Awards



Outstanding Supervisor award recipient, Outstanding Captain award recipients, and Outstanding Project Manager award recipients are required to submit a personal work summary and experience sharing within one month after the award is announced and are obligated to participate in the exchange meetings and surveys conducted by the RMOC.

The awards of the Outstanding Contribution are as follows. For selection, please refer to [Appendix 2 About Award Selection](#).

Table 4-6 Outstanding Contribution Awards

Award	Qty.	Reward
Outstanding Supervisor	No more than 8 people	<ul style="list-style-type: none"> Honorary Certificate Cash prize of USD \$ 1,500 (pre-tax)
Outstanding Captain	No more than 8 people	<ul style="list-style-type: none"> Honorary Certificate Cash prize of USD \$ 750 (pre-tax)
Outstanding Project Manager	No more than 8 people	<ul style="list-style-type: none"> Honorary Certificate Cash prize of USD \$ 750 (pre-tax)
Outstanding Advisor	No more than 8 people	<ul style="list-style-type: none"> Honorary Certificate Cash prize of USD \$ 450 (pre-tax)

Award	Qty.	Reward
Outstanding Volunteer	<ul style="list-style-type: none">● No more than 10 people per each division● No more than 15 people for the Final Tournament	Honorary Certificate

Appendix 1 Technical Assessment



Teams that pass the Technical Assessment of the RoboMaster 2020 Robotics Competition are considered to have directly passed the Technical Assessment of the RoboMaster 2020 Technical Challenge and do not need to submit repeatedly.

All teams that compete in the RM2020 must complete a Technical Assessment in accordance with the requirements of the RMOC and within the time specified. For the schedule of the RM2020 Technical Assessment, please refer to [2 Season Schedule](#).

The purpose of the Technical Assessment is to demonstrate the technical skills of a team, better prepare the team for the competition, help in the future development, improve the comprehensive competence of demand analysis, cost budgeting, data analysis, report compilation of team members. The total score of Technical Assessment will become one of the bases for division arrangement and seeded team setting of the Regional Competition. It is recommended that participating teams take the Technical Assessment seriously, play an active role in the process and fully demonstrate the team's strength.

Technical Assessment will be graded according to certain requirements and the grade will be displayed in the registration system. The following shows the relation between scores and grades:

Appendix Table 1 Rating System

Score Range	Level
$90 \leq X \leq 100$	A
$75 \leq X < 90$	B
$60 \leq X < 75$	C
$45 \leq X < 60$	D
$30 \leq X < 45$	E
$0 \leq X < 30$	F

Technical Assessment Task and Requirement

In RM2020, there are two Technical Assessment tasks in total: Referee System Examination and Final Robot Assessment Video. Teams can only submit once for Final Robot Assessment Video.

The total score of the Technical Assessment is the weighted average of scores of each section. Below shows the weight of each section:

Appendix Table 2 Weight of Each Section of Technical Assessment

Technical Assessment Task	-
Referee System Exam	-

Technical Assessment Task	-
Final Robot Assessment Video	70%

1. Referee System Examination

- Exam Form: Multiple-choice questions randomly selected from RoboMaster database. The full mark is 100
- Pass Requirement: 90 or above
- If the pass requirements have not been met within the valid time of the evaluation, repeat the completion of questions. Once several requirements are met, then it will immediately pass the review. The minimum interval between the start of the two questions is 20 minutes.
- The result of the exam is based on the highest score made within the effective exam period

2. Final Robot Assessment Video

- Submission Format: Video of each challenge and its BOM Report
- Basic Requirement: Display video of the participating robot of each challenge and its BOM Report
- Video requirements:
 - Information boards or captions must be shown at the beginning of the video, to include the following details: college name and date and location of recording
 - Every process must include captions or information boards, which must provide clear and accurate explanations for each process shown in the video
 - Ensure only relevant content is shown and the video is tightly edited lasting no longer than three minutes
 - The video's resolution must be higher than 720p.
 - Full lineup display
- Submission Method:
 - Upload the video to Youku/YouTube and set an access password
 - Submit the video URL, access password and BOM Form through the registration system
- Assessment Requirement: Different requirements and scoring standards apply to different items as set out in the table below:

Appendix Table 3 Final Robot Assessment Video Requirement

Competition	Display content	Scoring Criteria		Score
		Criteria for Pass	Criteria for Full Score	
Standard Racing and Smart Firing	Appearance	<ul style="list-style-type: none"> ● Circuit and electronic components have been protected to a certain extent and there are no bare wires ● Have certain shape ● The number and combinations of coating color meet the requirement 	<ul style="list-style-type: none"> ● Circuit and electronic components have been protected properly and there are no bare wires ● The aesthetic design is excellent and the shell is sophisticatedly manufactured ● The number and combinations of coating color meet the requirement and the coating design is aesthetic 	10

Competition	Display content	Scoring Criteria		Score
		Criteria for Pass	Criteria for Full Score	
	Complete movement	Show normal movement	There is no HP deduction caused by power consumption exceeding the limit during the rapid shuttle run and the omnidirectional movement is flexible	5
	Launch 50 rounds of 17 mm projectiles successively to the Small Armor Module three meters away and calculate the hit rate	Hit rate is no less than 50%	Hit rate is no less than 90%	20
	Climb a 15-degree slope and display the power consumption data in real time	When climbing the 15-degree slope, there is no HP deduction caused by power consumption exceeding the limit	Make the most of buffer energy and ensure that the power is stable with no HP deduction caused by power consumption exceeding the limit	10
	Display of the mounting location of the Referee System	<ul style="list-style-type: none"> Display the mounting hole of each referee system module separately 	Display the mounting hole of each referee system module separately and the mounting effect of the full set of the Referee System	20

Competition	Display content	Scoring Criteria		Score
		Criteria for Pass	Criteria for Full Score	
		<ul style="list-style-type: none"> The duration of mounting hole display of each module shall be not less than one second 		
	Launch Ramp	<ul style="list-style-type: none"> Can launch the ramp Can move normally after launching the ramp 	<ul style="list-style-type: none"> When launching the ramp, there is no HP deduction caused by power consumption exceeding the limit After launching the ramp, the robot lands smoothly and there is no collision of frames 	20
	Activation of power runes	Can automatically recognize and hit the Armor Module seven meters away	Can activate the Power Rune successfully	10

Competition	Display content		Scoring Criteria		Score
			Criteria for Pass	Criteria for Full Score	
	Other highlights		Except the above display content, there is one extra stable highlight to display	Except the above display content, there is two or more extra stable highlights to display	5
2V2 Battle	Standard	Appearance	<ul style="list-style-type: none"> ● Circuit and electronic components have been protected to a certain extent and there are no bare wires ● Have certain shape ● The number and combinations of coating color meet the requirement 	<ul style="list-style-type: none"> ● Circuit and electronic components have been protected properly and there are no bare wires ● The aesthetic design is excellent and the shell is sophisticatedly manufactured ● The number and combinations of coating color meet the requirement and the coating design is aesthetic 	5

Competition	Display content		Scoring Criteria		Score
			Criteria for Pass	Criteria for Full Score	
		Complete movement	Show normal movement	The power consumption should not exceed the limit during the rapid shuttle run and the omnidirectional movement is flexible	5
		Launch 50 rounds of 17mm projectiles successively to the Small Armor Module three meters away and calculate the hit rate	Hit rate is no less than 50%	Hit rate is no less than 90%	10
		Climb a 15-degree slope and display the power consumption data in real time	When climbing the 15-degree slope, there is no HP deduction caused by power consumption exceeding the limit	Make the most of buffer energy and ensure that the power is stable with no HP deduction caused by power consumption exceeding the limit	10

Competition	Display content		Scoring Criteria		Score
			Criteria for Pass	Criteria for Full Score	
		Display of the mounting location of the Referee System	<ul style="list-style-type: none"> ● Display the mounting hole of each referee system module separately ● The duration of mounting hole display of each module shall be not less than one second 	Display the mounting hole of each referee system module separately and the mounting effect of the full set of the Referee System	10
		Other highlights	Except the above display content, there is one extra stable highlight to display	Except the above display content, there is two or more extra stable highlights to display	10
	Sentry	Complete movement on the Sentry Rail	Can move stably on the Sentry Rail	Can move stably and rapidly on the Sentry Rail and there is no HP deduction caused by power consumption exceeding the limit	5

Competition	Display content		Scoring Criteria		Score
			Criteria for Pass	Criteria for Full Score	
		Launch 50 rounds of 17mm projectiles successively to the Small Armor Module three meters away and calculate the hit rate	Hit rate is no less than 50%	Hit rate is no less than 90%	15
		Display of the mounting location of the Referee System	<ul style="list-style-type: none"> ● Display the mounting hole of each referee system module separately ● The duration of mounting hole display of each module shall be not less than one second 	Display the mounting hole of each referee system module separately and the mounting effect of the full set of the Referee System	10
		Visual counterattack	Can recognize armors	<ul style="list-style-type: none"> ● Can rapidly recognize armors of a moving Standard 	20

Competition	Display content		Scoring Criteria		Score
			Criteria for Pass	Criteria for Full Score	
				<ul style="list-style-type: none"> ● The attack hit rate is greater than 50% ● Can defeat a moving Standard within 15 seconds 	
Engineer Projectile Obtaining	Complete movement:		Show normal movement	Shuttle run is rapid and the omnidirectional movement is flexible	20
	Climb the slope		Can climb the 15-degree slope	Pass the 15-degree slope rapidly, move stably, evenly and flexibly	20
	Obtain projectiles		Can obtain projectiles inside the Projectile Container on the Resource Island	Can obtain all projectiles inside the three Projectile Containers on the diagonal position of the Resource Island, hand over successfully and display the duration of the whole process	60
Dart Targeting	Adjusting the angles of pitch and yaw axes of the dart launcher		Have angle adjustment mechanism	Can rapidly adjust the axis angle of pitch and Yaw	20

Competition	Display content	Scoring Criteria		Score
		Criteria for Pass	Criteria for Full Score	
	Loading and launching darts	Can launch and load darts	Can continuously load and launch darts	20
	Launching darts to attack a target at an outpost's distance	Can launch darts near to the target at an outpost's distance	Can hit the target	40
	Demonstrating the installation of the Referee System (or the installation spot reserved for the Referee System)	<ul style="list-style-type: none"> ● Display the mounting hole of each referee system module separately ● The duration of mounting hole display of each module shall be not less than one second 	Display the mounting hole of each referee system module separately and the mounting effect of the full set of the Referee System	20

- BOM Report Assessment Requirement All challenges are applicable to the following requirements and score:

Appendix Table 4 BOM Report Requirement

Display content	Scoring Criteria		Score
	Criteria for Pass	Criteria for Full Score	
BOM Report	Part BOM is complete, including unit price and total price	<ul style="list-style-type: none"> ● BOM of all parts, including screws ● Classification is clear and well-arranged 	10

Appendix 2 About Award Selection

Individual winners or team winners of Open Source Award are required to submit experience sharing for the award.

A. Open Source Award

a) Selection Rules

The RMOC will score the open source materials according to the following two criteria: the basic format and content. The specific details and scores of each criterion used will be announced separately.

- (95, 100]: Open Source Grand Prize
- (90, 95]: Open Source First Prize
- (85, 90]: Open Source Second Prize
- (80, 85]: Open Source Third Prize
- (70, 80]: Open Source Outstanding Prize

b) Application Process

To be determined.

B. Outstanding Contribution Awards

Appendix Table 5 Outstanding Contribution Awards Selection Criteria

Award	Selection Criteria	Selection Method
Outstanding Supervisor	<ul style="list-style-type: none"> ● The team that the Advisor belongs to displays a good competitive spirit, and there exist no violations that seriously breach the rules and the spirit of civilized competition ● Guides the student team and instills team culture, displays a high sense of responsibility, is caring towards each team member, cares about the growth and development of students in the field of competition, and is deeply revered by said students 	<ol style="list-style-type: none"> 1. Participants shall submit the "RM2020 Outstanding Supervisor Application Form" to apply 2. After the participants apply, the RMOC selects the best according to the "application form"

Award	Selection Criteria	Selection Method
<p>Outstanding Captain</p>	<ul style="list-style-type: none"> ● The team that the Advisor belongs to displays a good competitive spirit, and there exist no violations that seriously breach the rules and the spirit of civilized competition ● The Captain's team actively cooperates with the RMOC and is willing to share knowledge, create a good communication atmosphere in the team circle; ensure the official information access rate within the team; completes the participation process on time ● The team is divided according to the performance level, and the performance level of the current season is maintained at the same level as or improved from that of the previous competition 	<ul style="list-style-type: none"> ● Participates in the Captain's discussions, the content of the discussions is widely endorsed, and the top three votes after each discussion will enjoy extra points ● Performance level: <ol style="list-style-type: none"> 1. Regional Competition Third Prize 2. Regional Competition Second Prize/Final Tournament Third Prize 3. Final Tournament Second Prize 4. Final Tournament First Prize 5. Final Tournament Champion, First Runner-up, Second Runner-up
<p>Outstanding Project Manager</p>	<ul style="list-style-type: none"> ● The team that the Advisor belongs to displays a good competitive spirit, and there exist no violations that seriously breach the rules and the spirit of civilized competition ● Employs good project management methods, controls the overall progress of the project, comprehensively considers R&D costs, work safety, etc., and comprehensively manages the whole work 	<p>Selected according to the Project Manager's assessment score ranking</p>

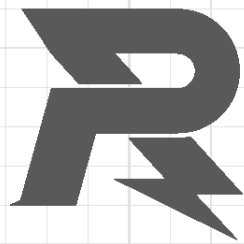
Award	Selection Criteria	Selection Method
<p>Outstanding Advisor</p>	<ul style="list-style-type: none"> ● The team that the Advisor belongs to displays a good competitive spirit, and there exist no violations that seriously breach the rules and the spirit of civilized competition ● In the aspects of technological innovation, tactical design, team management, team building, etc., the advisor provides constructive and practical suggestions to the team, and provides guidance and support to the team in strategy, technology and management 	<ol style="list-style-type: none"> 1. Participants shall submit the "RM2020 Outstanding Advisor Application Form" to apply 2. After the participants apply, the RMOC selects the best according to the "application form"
<p>Outstanding Volunteer</p>	<ul style="list-style-type: none"> ● Participates in RM2020 volunteer work, understands, respects, and loves the RoboMaster competition, and actively cooperates with the work of the RMOC ● The volunteer is diligent and pragmatic, displays teamwork spirit, and shows outstanding performance in volunteer work ● Displays no dereliction of duty, misconduct, or major work mistakes 	<p>Nomination is done by the person in charge of the RMOC, and selection is then made according to the nomination materials</p>

Appendix 3 Safety Instruction

Every team member participating in the RoboMaster 2020 must fully understand and accept that safety is the most important issue for the sustainable development of the RoboMaster Competition. In order to protect the rights and interests of all team members and the event organizers, and according to relevant laws and regulations, all team members who have registered for RM2020 will be deemed to have acknowledged and agreed to abide by the following safety terms:

1. All team members who have registered to take part in the RoboMaster 2020 Competition confirm that they possess the full capacity for civil conduct and can independently create and operate robots. All team members further confirm that, before using any products of the competition organizer SZ DJI Technology Co., Ltd., to create any robots, they will read in detail the RoboMaster 2020 Robotics Competition registration guide, competition regulations, and other important documents containing rules and regulations related to the competition.
2. During the competition, all participants should make sure that their actions including the creation, testing, and use of robots will not cause any injury or damage to his or her teammates, members of the opposing teams, staff, audience, equipment, or the competition venue.
3. All teams must ensure that the structural design of their robots will not hinder safety inspection during Pre-Match Inspection, and agree to fully cooperate in the Pre-Match Inspection carried out by RoboMaster's organizers.
4. All teams guarantee that they will not use any internal combustion engines, explosives, or high-pressure gas as working gas, or any dangerous materials.
5. During any stage of the R&D, preparation or competition period, all team members must be fully aware of any potential safety issues, and the team's Supervisor is responsible for instructing and supervising the team on safety issues.
6. All teams must guarantee the safety of all robots. This includes ensuring the projectile launchers installed on robots are safe, and that they will not cause any harm either directly or indirectly to any Operator, referee, staff member or audience member.
7. All teams will take sufficient and necessary safety measures during the R&D, training and competition periods regarding any hazardous situations that may occur. These include but are not limited to: preventing the control system from becoming unstable; anticipating every operation step prior to execution to avoid errors or collisions between team members or between robots and team members; prohibiting team members from engaging in solo training and making sure personnel are available as emergency responders to any situation; wearing goggles and helmets; applying the spotlight lock function and adding an emergency stop function other measures in a robot during debugging.

8. Teams will be held responsible for all accidents and losses resulting from the technical faults of robots, loss of control of UAVs or any other unexpected circumstances.
9. The materials bought from or provided by the organizer SZ DJI Technology Co., Ltd., such as batteries and the Referee System, must be used in accordance with their instructions. SZ DJI Technology Co., Ltd. will not be held responsible for any injuries that arise from improper use of these materials. Teams will be held responsible for any injuries caused to their own members or any third party and for any property loss arising from creating and operating any robots.
10. All team members must remain in strict compliance with the laws and regulations of the country or region. All team members pledge that their robots will only be used for the RoboMaster competitions and that their robots will not be illegally modified or used for any illicit purpose.



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