

V1.3

Using a 55-58 motor driver cable and Field-Oriented Control (FOC), the RoboMaster C200 Brushless DC Motor Speed Controller enables precise control over motor torque.



ROBOMASTER

Especially designed for the RoboMaster M3500 PMS Brushless DC Motor and C200 Brushless DC Motor Speed Controller, this M3500 Accessories Kit includes universal cables and a terminal board.

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

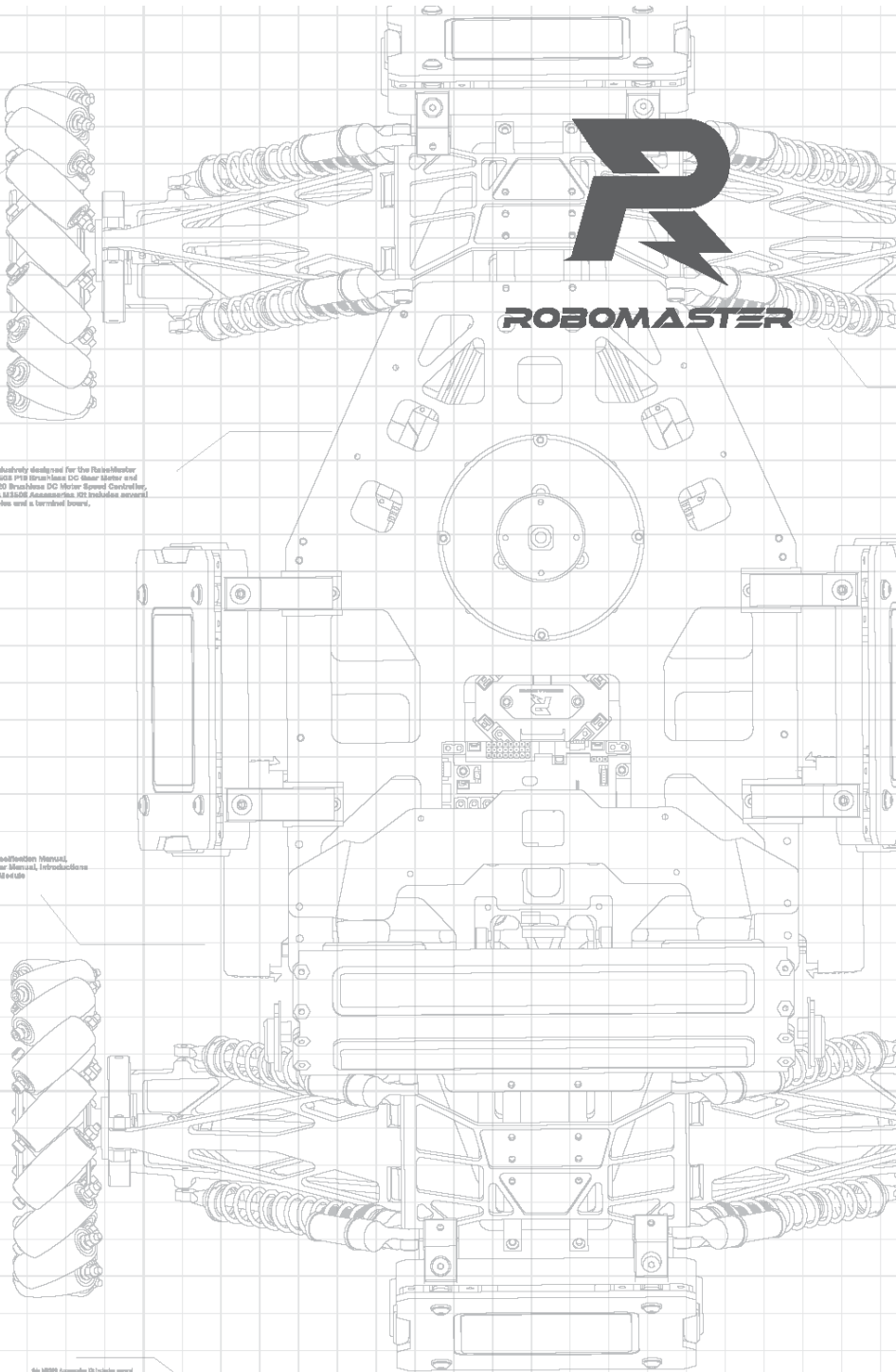
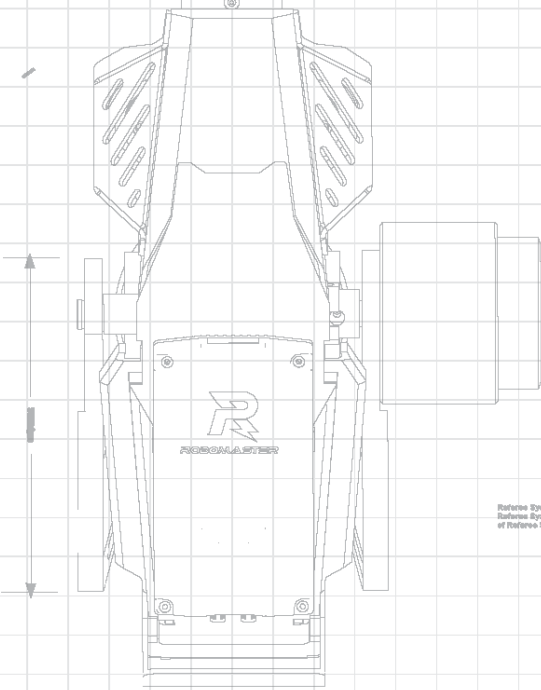
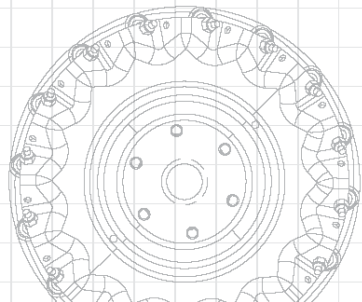
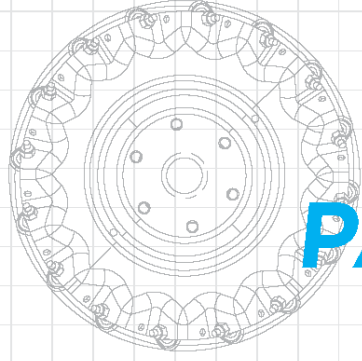
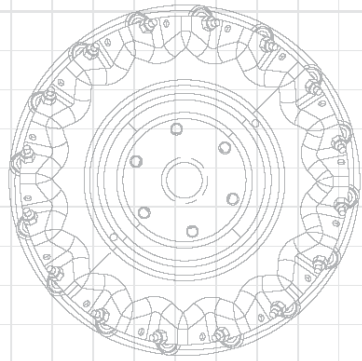
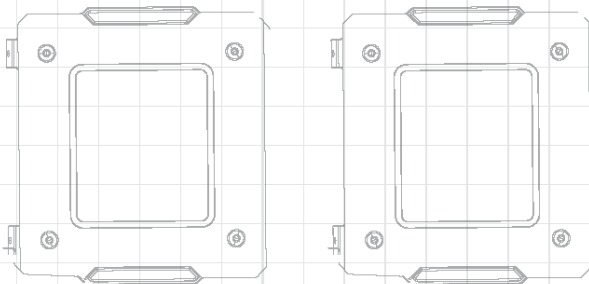
An M3500 Accessories Kit includes universal cables and a terminal board, supporting cables in either connection by two independent status.

ROBOMASTER 2020

TECHNICAL CHALLENGE

PARTICIPANT MANUAL

Prepared by the RoboMaster Organizing Committee
Released on May, 2020



Statement

Participants are forbidden from engaging or participating in any actions determined by the RoboMaster Organizing Committee (hereinafter referred to as “the RMOC”) as involving public disputes or sensitive issues or causing offence to the public or certain social groups, or damaging the image of RoboMaster; otherwise, RMOC shall have the right to disqualify offending persons permanently from the competition.

Using this Manual

Legend

 Penalty zone	 Important notes	 Hints and tips	 Definitions and references
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Release Notes

Date	Version	Changes
2020.05.27	V1.3	<ol style="list-style-type: none"> Adjust the time of some sections in the Season Schedule. Add new definitions and updating requirements for participants and participating teams. Add Organization Award and selection criteria. Adjust the setup of Open Source Award.
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 criteria for Open Source Award. Add new items and selection criteria to Outstanding Contribution Awards. Update Final Robot Assessment Video requirements in Appendix 1 Technical Assessment.
2019.10.31	V1.0	First Release

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1. Introduction

Founded by DJI Technology Co., Ltd. and designed for young engineers, RoboMaster is a global educational robotics program that includes competitions, campus clubs, cultural merchandise and other initiatives.

The RoboMaster Competition is China's first combat-type robotics competition co-organized by the Communist Youth League of China and Shenzhen Municipal People's Government. It requires participants to go beyond their textbooks to form a robotics team, develop a diverse fleet of robots and participate in team battles. Through the competition, students gain invaluable industrial practice and strategic planning skills. This helps to combine their book knowledge with practice in this field, and enables the most advanced and intelligent robots to be built through intense competition.

More than a robotics competition for students in China, 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 season schedule is for reference only. The specific time is subject to the latest announcement by the RMOC.

The Technical Challenge is a component under RoboMaster Competition. The season schedule for the 19th RoboMaster 2020 Technical Challenge (hereinafter referred to as “RM2020 Technical Challenge”) among colleges and universities consists of an online schedule and an 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 so as to avoid unnecessary iterations of robots and wasting funds.

Teams that complete the registration and pass the Technical Assessment qualify for the competition. For details about Technical Assessment specifications, please refer to “Appendix 1 Technical Assessment”. Teams registering for the Technical Assessment can enjoy product discounts. See RoboMaster 2020 Instructions for Purchasing Materials for more details.

Table 2-1 Online schedule

Schedule	Section	Category	Entry Qualification
October 15, 2019, 12:00- November 15, 2019, 12:00	Registration on Official Website	Teams from mainland China; Teams from Hong Kong, Macau, Taiwan and Overseas	Log in the RoboMaster website and complete the registration as required.
April 3, 2020, 12:00-April 4, 2020, 12:00	Technical Assessment - Referee System Exam	Teams from mainland China; Teams from Hong Kong, Macau, Taiwan and Overseas	The team will receive permission to submit a Final Robot Assessment Video.
Subject to the latest announcement.		Teams from mainland China	Obtain loaner access for the participating robots’ referee systems and qualification for the China Regional Competition.

Schedule	Section	Category	Entry Qualification
	Technical Assessment - Final Robot Assessment Video	Teams from Hong Kong, Macau, Taiwan and Overseas	Obtain loaner access for the participating robots' referee systems and qualification for the final tournament.
Subject to the latest announcement.	Team's preferred divisions	Teams from mainland China	-



Teams that give up this season's offline events due to the epidemic can participate in [Online Assessment](#).

Table 2-2 Offline schedule

Schedule	Section	Category	Entry Qualification
Subject to the latest announcement.	China Regional Competition	Teams from mainland China	<ul style="list-style-type: none"> Teams from mainland China that pass Final Robot Assessment Video qualify for the China Regional Competition. Teams may choose their divisions or accept the arrangements of the RMOC. The RMOC will decide which team has the prior right to choose their divisions based on their total Technical Assessment score rankings.
		Teams from mainland China	Teams that rank higher in regional competitions qualify for the Final Tournament.
Subject to the latest announcement.	Final Tournament	Teams from Hong Kong, Macau, Taiwan and Overseas	Directly qualify for the Final Tournament.

3. Participation

Teams are divided into three categories: teams from mainland China, Teams from Hong Kong, Macau, Taiwan and Overseas, and Chinese and Foreign Joint Teams. The category of and entry procedure for a Chinese and Foreign Joint Team is determined based on the geographical locations of the colleges or universities.

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 events. Please refer to the table below for the roles and responsibilities of the participants:



For participants who have submitted their registration information to the registration system before May 2020, their status registration can be extended from "before August 2020" to "before December 2020".

Table 3-1 Participant roles and responsibilities

Roles	Role Instructions	No. of Persons	Status	Responsibilities
Supervisor	<ul style="list-style-type: none"> The main person in charge of the team, responsible for the formation and management of the team Responsible for guiding the team in robot-building 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	No. of Persons	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 degree candidates in colleges and universities, as well as engineers, researchers and faculty members working in enterprises, research institutions, or as freelancers	<ul style="list-style-type: none"> ● Provide guidance and support to the team on strategy, technology, management, etc. ● An advisor can undertake robot-building tasks and handle other competition-related matters.
Team Member	<ul style="list-style-type: none"> ● Including Captain, Project Manager and General Member, see the table below for details ● They are not allowed to assume both the roles of Advisor and Supervisor. 	Meet the requirements stated in “Table 3-3 The Number of Team Members in Each Challenge”	Full-time junior college students, undergraduates, postgraduates, and doctoral degree candidates in colleges and universities, with proof of student identity up to August 2020.	See the table below for details

Table 3-2 Team Member’ roles and responsibilities

Roles	Role Instructions	Quantity	Responsibilities
Captain	<ul style="list-style-type: none"> ● Core team member, the team’s technical and tactical leader ● The main liaison with the RMOC ● Cannot serve as Project Manager 	1	<ul style="list-style-type: none"> ● Responsible for the division of labor, overall planning and tactical arrangement and adjustment ● Attend Captains Meetings, represent the team in confirming match results, and participate in appeal processes and attend to any appeal during the competition ● Responsible for the legacy and development of the team after the competition

Roles	Role Instructions	Quantity	Responsibilities
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 The Number of Team Members in Each Challenge”	-

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 Confrontation	3-10	4 (including Projectile Supplier)
Dart Targeting	2-5	4

3.2 Participating Team

A participating team is required to meet the following requirements:

1. If any two or more teams do not meet any one requirement under the “Five Differences” Rule, they shall be treated as the same team.



The “Five Differences” Rule: Different team names, different team members, different supervisors, different affiliated institutions (college or other educational institutions), and different robots.

2. A team can apply to participate in different competitions in the RoboMaster series (including the Robotics Competition, Technical Challenge, AI Challenge, and Provincial Competition).





Registrations have to meet the respective registration requirements of the different competitions.

- The RMOC will deem a team participating in different competitions in the same season as the one and same group, in handling the various competition processes (including free material supply, material purchases, and participation support). A team cannot be broken up after completing registration for the season.

The below shows the definition, participation rights and entry procedures for each type of teams.

Table 3-4 Categories of participating teams

Teams from mainland China	
Definition	University or college participating teams that pass the registration review within the specified period, meet the relevant competition entry requirements and are geographically located in mainland China.
Participation Rights	Qualified for the 2020 Season competitions, awards application and promotion.
Entry Procedures	<ol style="list-style-type: none"> Competition processes carried out in accordance with the standards for teams from mainland China.  Competition processes include free material supply, material purchases, and participation support. Teams that participate in China Regional Competitions and perform excellently are promoted to Final Tournament.
Teams from Hong Kong, Macau, Taiwan and Overseas	
Definition	University or college participating teams from Hong Kong, Macau, Taiwan and overseas that pass the registration review within the specified period and meet the relevant entry requirements.
Participation Rights	<p>Qualified for the 2020 Season competitions, awards application and promotion.</p>  Due to their different education systems, senior high school students are allowed to participate in teams from Hong Kong, Macau, Taiwan and overseas, but their number must not exceed 20% of the total number of team members.
Entry Procedures	<ol style="list-style-type: none"> Competition processes are carried out in accordance with the standards for teams from Hong Kong, Macau, Taiwan and overseas. Directly qualify for the Final Tournament.
Chinese and Foreign Joint Teams	

Definition	Teams formed between a university or college from mainland China and a university or college from Hong Kong, Macau, Taiwan and overseas that pass the registration review within the specified period and meet the relevant entry requirements.
Participation Rights	Qualified for the 2020 Season competitions, awards application and promotion.
Entry Procedures	<ol style="list-style-type: none"> 1. If the school's geographical location is in mainland China, its team is subject to the competition processes in accordance with the standards for teams from mainland China. 2. 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, Macau, Taiwan and overseas. Chinese and Foreign Joint Teams should meet the requirements stated in R4 in “3.3 Other Requirements”

3.3 Other Requirements

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

- R1. Any team participating in different competitions must use the same team name. A team’s name must be in the format of “XXX Team”, where “XXX” shall be the team’s self-chosen name. 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. If the RMOC determines that a team’s name does not align with the spirit of the competition, it has the right to require the team to change its name.
- R2. A participating team must be attached to a university or college, and must meet the requirements for the roles, number and identity of participants stated in “3.1 - Participants”.
- R3. In principle, each college or university is only allowed to have one qualified team for one competition (challenge). Institutions having multiple campuses in different cities, making it difficult for certain students to compete as a team, are allowed to form more than one campus-based teams provided it has been verified by the RMOC. Teams must obtain authorization from their university or college to participate in the competition and submit the proof to the registration system. Refer to the registration system for the authorization letter template. The first precondition for a team’s registration for the competition is to obtain a stamped authorization from its university or college (or its campus). The applicant must ensure that its registration information is complete and accurate, and that it will undertake the corresponding responsibilities. The applicant must bear all consequences caused by any missing or inaccurate information. For special

circumstances, the applicant may contact the RMOC, which will handle the case based on actual circumstances. The RMOC reserves the right of final interpretation.

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 The registered team name shall be “Intercollegiate Team” instead of “Team”. An Intercollegiate Team is required to upload an Intercollegiate Team Statement issued by its college or university to the registration system. Refer to the registration system for the template of the Intercollegiate Team Statement.

R4.4 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 regular 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 R2, 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 further contact information and Q&A rules of the RMOC, please refer to RoboMaster Organizing Committee Official Contact Details and FAQ Rules.

Table 3-5 Platform for Communication and Q&A

Channel	Office Hours	Remarks
Forum: bbs.robomaster.com	Office hours: 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 indicate "competition + college name + designation + 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	Quantity	Prizes
National First Prize	Champion: 1st place	1	<ul style="list-style-type: none"> ● Champion trophy ● First Prize Achievement Certificate ● 5000 RMB (pre-tax)
	First Runner-Up: 2nd place	1	<ul style="list-style-type: none"> ● First runner-up trophy ● First Prize Achievement Certificate ● 5000 RMB (pre-tax)
	Second Runner-Up: 3rd place	1	<ul style="list-style-type: none"> ● Second runner-up trophy ● First Prize Achievement Certificate ● 5000 RMB (pre-tax)
	4th place	1	<ul style="list-style-type: none"> ● First Prize Achievement Certificate ● 5000 RMB (pre-tax)
National Second Prize	-	Multiple	Second Prize Achievement Certificate
National Third Prize	-	Multiple	Third Prize Achievement 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	Quantity	Prizes
National First Prize	Multiple	<ul style="list-style-type: none"> ● First Prize trophy ● First Prize Achievement Certificate ● 5000 RMB (pre-tax)

Award	Quantity	Prizes
National Second Prize	Multiple	Second Prize Achievement Certificate
National Third Prize	Multiple	Third Prize Achievement Certificate

4.2 China Regional Competition



The number of prizes of each challenge is subject 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	Quantity	Prizes
Regional Competition First Prize	Champion: 1st place	1	<ul style="list-style-type: none"> ● Champion trophy ● First Prize Achievement Certificate ● 3000 RMB (pre-tax)
	First Runner-Up: 2nd place	1	<ul style="list-style-type: none"> ● First runner-up trophy ● First Prize Achievement Certificate ● 3000 RMB (pre-tax)
	Second Runner-Up: 3rd place	1	<ul style="list-style-type: none"> ● Second runner-up trophy ● First Prize Achievement Certificate ● 3000 RMB (pre-tax)
	4th place	1	<ul style="list-style-type: none"> ● First Prize Achievement Certificate ● 3000 RMB (pre-tax)
China Regional Competition Second Prize	-	Multiple	Second Prize Achievement Certificate
China Regional Competition Third Prize	-	Multiple	Third Prize Achievement 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	Quantity	Prizes
China Regional Competition First Prize	Multiple	<ul style="list-style-type: none"> ● First Prize Achievement Certificate ● Cash prize of RMB 3,000 (pre-tax)
China Regional Competition Second Prize	Multiple	Second Prize Achievement Certificate
China Regional Competition Third Prize	Multiple	Third Prize Achievement 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 setup of the Open Source Award is as follows. For details on the award criteria, please refer to “Appendix 2 - Award Criteria”.

Table 4-5 Open Source Awards

Award	Quantity	Prizes	Remarks
Open Source Grand Prize	Multiple	<ul style="list-style-type: none"> ● Achievement certificates ● RMB 100,000 (pre-tax) 	In the RM2020 season (September 20, 2019 to November 30, 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 First Prize	Multiple	<ul style="list-style-type: none"> ● Achievement certificates ● RMB 50,000 (pre-tax) 	
Open Source Second Prize	Multiple	<ul style="list-style-type: none"> ● Achievement certificates ● RMB 30,000 (pre-tax) 	
Open Source Third Prize	Multiple	<ul style="list-style-type: none"> ● Achievement certificates ● RMB 10,000 (pre-tax) 	
Open Source Outstanding Prize	Multiple	<ul style="list-style-type: none"> ● Achievement certificates ● Grade A: RMB 5,000 (pre-tax) ● Grade B: RMB 3,000 (pre-tax) 	

Award	Quantity	Prizes	Remarks
		<ul style="list-style-type: none"> ● Grade C: RMB 2,000 (pre-tax) 	

4.4 Outstanding Contribution Awards



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

The setup of the Outstanding Contribution Awards is as follows. For details on the award criteria, please refer to “Appendix 2 - Award Criteria“.

Table 4-6 Outstanding Contribution Awards

Award	Quantity	Prizes
Outstanding Supervisor	No more than 8 people	<ul style="list-style-type: none"> ● Achievement certificates ● Cash prize of RMB 8,000 (pre-tax)
Outstanding Captain	No more than 8 people	<ul style="list-style-type: none"> ● Achievement certificates ● Cash prize of RMB 5,000 (pre-tax)
Outstanding Project Manager	No more than 8 people	<ul style="list-style-type: none"> ● Achievement certificates ● Cash prize of RMB 5,000 (pre-tax)
Outstanding Advisor	No more than 8 people	<ul style="list-style-type: none"> ● Achievement certificates ● Cash prize of RMB 3,000 (pre-tax)
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 	Achievement certificates

4.5 Organization Awards

Table 4-7 Organization Awards

Award	Quantity	Prizes
Competitive Spirit Award	No more than 5 people	<ul style="list-style-type: none"> ● Achievement certificates

Award	Quantity	Prizes
		<ul style="list-style-type: none"> ● Cash prize of RMB 5,000 (pre-tax)
Discipline Building Award	No more than 5 people	<ul style="list-style-type: none"> ● Achievement certificates ● Cash prize of RMB 3,000 (pre-tax)
Rising Star Award	Multiple	<ul style="list-style-type: none"> ● Achievement certificates ● RoboMaster M3508 DC Gear Motor worth RMB 1,996

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 and facilitate its future development, improve the comprehensive competence of team members in demand analysis, budgeting, data analysis and report preparation. The total score of Technical Assessment will become one of the bases for preferred division choosing. 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 Tasks and Requirements



The latest tasks and requirements relating to each section of the Technical Assessment shall be based on announcements on the official website.

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	Weight
Referee System Exam	30%
Final Robot Assessment Video	70%

1. Referee System Exam

- Exam Format: Multiple-choice questions randomly drawn from the question bank, with a full mark of 100.
- Passing Requirement: 90 or above
- If the passing requirement is not met within the effective time period, the questions can be answered repeatedly. Once several requirements are met, then it will immediately pass the review. The interval between the starting time of any two attempts must be above 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:
 - College name and date and location of recording must be shown at the beginning of the video
 - 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 Report 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

Parameter	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
	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 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%	20

Parameter	Display content	Scoring Criteria		Score
		Criteria for Pass	Criteria for Full Score	
	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 ● 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
	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

Parameter	Display content		Scoring Criteria		Score
			Criteria for Pass	Criteria for Full Score	
	Activation of power runes		Can automatically recognize and hit the Armor Module seven meters away	Can activate the Power Rune successfully	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	5
2V2 Confrontation	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
		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

Parameter	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%	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
		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

Parameter	Display content		Scoring Criteria		Score
			Criteria for Pass	Criteria for Full Score	
	Sentry	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
		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
		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 	Display the mounting hole of each referee system module separately and the mounting effect of the full set of the Referee System	10

Parameter	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 		20
		Visual counterattack	Can recognize armors	<ul style="list-style-type: none"> Can rapidly recognize armors of a moving Standard 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	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

Parameter	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"> ● Clear classification of modules ● Information is true and complete ● Intuitive presentation of data 	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 Criteria

The RMOC will score the open source materials according to the following two criteria: 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



Participating teams that have been awarded with Outstanding Supervisor, Outstanding Captain, Outstanding Project Manager or Outstanding Advisor in RM2020 Robotics Competition cannot apply for the Outstanding Contribution Award in Technical Challenge.

Appendix Table 5 Outstanding Contribution Awards Selection Criteria

Award	Selection Criteria	Selection Method
Outstanding Supervisor	<ul style="list-style-type: none"> ● The team displays a good competitive spirit, with no serious violations of competition rules and proper standards of conduct. ● 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 displays a good competitive spirit, with no serious violations of competition rules and proper standards of conduct. ● 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 categorized according to its performance level, and it has maintained or improved its performance level from the previous competition season. 	<ul style="list-style-type: none"> ● Participates in Captains’ discussions, where the views shared by the Captain in the discussions are endorsed by the majority. Extra points are given to Captains receiving the top three highest votes after each discussion. ● 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
<p>Outstanding Project Manager</p>	<ul style="list-style-type: none"> ● The team displays a good competitive spirit, with no serious violations of competition rules and proper standards of conduct. ● 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. 	<ul style="list-style-type: none"> ● Participates in Captains’ discussions, where the views shared by the Captain in the discussions are endorsed by the majority. Extra points are given to Captains receiving the top three highest votes after each discussion. ● Project management assessment reports are submitted on time, with active organization of team management tasks, contributing to an increase in the team’s management standards.

Award	Selection Criteria	Selection Method
		<ul style="list-style-type: none"> Selected according to the Project Manager's assessment score ranking
Outstanding Advisor	<ul style="list-style-type: none"> The team displays a good competitive spirit, with no serious violations of competition rules and proper standards of conduct. 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"> Participants shall submit the "RM2020 Outstanding Advisor Application Form" to apply After the participants apply, the RMOC selects the best according to the "application form"
Outstanding Volunteer	<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>

C.Organization Awards

Appendix Table 6 Organization Award Selection Criteria

Award	Selection Criteria	Selection Method
Competitive Spirit Award	<ul style="list-style-type: none"> The team displays a good competitive spirit, with no serious violations of competition rules and proper standards of conduct. 	<ul style="list-style-type: none"> Selections to be made according to the feedback given by the staff of the RMOC, other teams, and volunteers of the competition.

Award	Selection Criteria	Selection Method
	<ul style="list-style-type: none"> ● The team is active in forums, WeChat groups, etc., and interacts well with the RMOC, volunteers, and other teams ● The team is helpful, active and an open source of information for others, enthusiastically sharing their experiences and willing to provide resources to other teams 	<ul style="list-style-type: none"> ● Teams with more positive feedback from the RMOC staff, other teams, and event volunteers will be given priority
<p>Discipline Building Award</p>	<ul style="list-style-type: none"> ● The team displays a good competitive spirit, with no serious violations of competition rules and proper standards of conduct. ● The team or its lab has extensive robotics-related competition experience. ● The team or its lab has extensive patents, publications or scientific research records in the field of robotics. ● The team or its lab is an abundant source of information on entrepreneurship, employment and further education. ● The team’s supervisor establishes relevant RoboMaster courses or incorporates subject knowledge from RoboMaster into the curriculum, or creates a RoboMaster research lab, etc. 	<ul style="list-style-type: none"> ● The selection will be made by the RMOC based on the various team information collected relating to each aspect. ● Preference is given to teams with abundant information and that perform well in multiple aspects.
<p>Rising Star Award</p>	<ul style="list-style-type: none"> ● Any team from mainland China or from Hong Kong, Macau, Taiwan and Overseas that has not qualified for the last two RoboMaster Robotics Competitions (RM2018, RM2019). ● The team has not for the past two seasons (RM2018, RM2019) received any free material supply provided specifically for teams that are first-time participants in the competition 	<p>Selection is made based on registration information.</p>

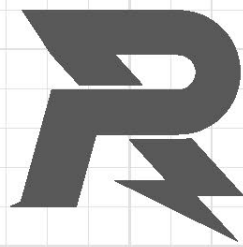
Award	Selection Criteria	Selection Method
	<ul style="list-style-type: none"><li data-bbox="343 235 965 324">● The team has not registered for RM2020 Robotics Competition<li data-bbox="343 347 965 593">● The team agrees with and accepts the relevant terms of the free material supply contract (for details, please refer to the “RoboMaster 2020 Robotics Competition Free Material Supply Contract”)	

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 with 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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