



Melbourne Combat Robotics Rules

Version: 2.2 May 2022

These rules are split into two parts “Competitor Rules” and “Match Rules”. Both are based on Sparc Tools International Rules and the Match Rules have adjustments that align with the Adelaide Robot Combat rules. This ruleset is aligned with the Adelaide Robot Combat (ARC).

All classes use the Sparc Tools Rules International rule set.

[http://sparc.tools/wordpress/wp-content/uploads/2019/SPARC Robot Construction Specifications v1.3.pdf](http://sparc.tools/wordpress/wp-content/uploads/2019/SPARC_Robot_Construction_Specifications_v1.3.pdf)

IMPORTANT

While the Sparc ruleset above is a comprehensive build and match set of rules, there are local rules that overrule the Sparc rules to cater for local conditions.

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Melbourne Combat Robotics (MCR) Competitor Rules:

Version: 2.1 May 2022

These rules are based on Sparc Tools and with adjustments for local competition needs.

Outlawed

- No liquids
- No Projectiles
- No Flame throwers
- No Entanglement devices (string, small chains, etc)
- No tip speed greater than 250kmh
- No High-pressure systems (e.g., High pressure pneumatics or hydraulic systems)

If you are not building a typical combat robot weapon or drive system, then check that the design is acceptable to the MCR Committee and avoid immediate disqualification on competition day.

Classes

A League: Destructive Class:

A League or Destructive Class is an open class that allows combat robots that have high kinetic weapons. While all bots of this class need to have an active weapon, they do not have to be high kinetic weapons. These can include but not limited to spinners, crushers, hammers, lifters, flippers etc

To compete in this class, each competitor needs to understand and accept that their bot could be potentially damaged or destroyed. Robots cannot be swapped out for other bots so the bot's first bout could be its last.

Safety is a priority in this class. A spinning weapon on even ant weight bots could cause injury. Only ever start your bot in the confines of the arena or test box.

B League: Non-Destructive Class:

The intent of Non-Destructive Class is that competitors do not leave with a bag of bits, and able to compete again with either minor or no repairs.

This is a class which will be relying on the “spirit” of the rules rather than just relying on the literal interpretation. Weapons are allowed and damage can be done but by less aggressive means such as flipping, grabbing, or pushing.

High kinetic weapons such as spinners or crushers don't fit into this class unless it can be shown to the judges that the weapon is not capable of aggressive damage – and outcome will be decided at judge's discretion. Check before the competition if you are unsure to avoid immediate disqualification.

Class Weight Rules

Weight Bonus

There are no weight bonuses. This includes any sort of walker, bristle bots, etc.

NB. The only exception to the weight bonus rule is by committee discretion which would be based on if a robot has significant special aspects of interest to the combat robot community and are not using the bonus to enhance the weapon or armour. An example of this would be 8 legged “spider” design. If you believe your design has special aspects of interest, contact the MCR Committee for clarification and confirmation **BEFORE** a competition event date.

Weight and Size Limits

Weight limits will be upheld. All robots will be weighed before the competition starts. The event organisers also have the right to re-weigh any robot at any stage during the competition.

Ensure all robots meet the weight limits or they will not be able to compete on the day.

Antweight Class – A and B Leagues.

- 150g Maximum.
- This is for all aspects of the total Antweight build (yes, that includes battery and receiver)
- No dimension greater than 250mm

Beetleweight Class – A League

- 1.36 Kg Maximum
- This is for all aspects of the total Beetleweight build (yes, that includes battery and receiver)
- No dimension greater than 400mm

Active Weapon Rule

A League – Destructive Class

A League Destructive Class will follow Battlebot's lead and all robots in this class for both Antweight or Beetleweight must have a moving weapon controlled by the transmitter (Lifter, grabber, crusher, spinner, flipper, etc). In the spirit of the competition this includes multi-brains) If you are unsure that your bot design check complies with the spirit of this rule then check with the MCR Committee before the date of the competition. Robots that have competed in the MCR Competition before Jan 1 2022, this exception expires on the 1st October 2022.

B League – Non-Destructive Class

B League non-destructive robots **are** allowed bots that have no active weapon (which includes wedge pushers etc).

Important: *If you have a design that you are unsure of, reach out to the MCR Committee for clarification of your robot's eligibility early in the design process to check to avoid being disqualified on the day.*

Competition Day

MCR is a family friendly and inclusive environment for people to have fun while designing and competing with combat robots. Combat robotics is famous worldwide for its sportsmanship between fellow competitors even at the highest levels.

Behaviour

Competitor Behaviour

- This is event run by volunteers, and it's not for sheep stations. Respect your fellow competitors, officials and general public.
- Bad behaviour will not be tolerated and can result in immediate ejection from the event and could lead to being banned from future events.
- Relax, and enjoy the fun and sportsmanship.

Public Behaviour

- Bad behaviour from the general public is not tolerated and they will be immediately ejected. If a competitor has friends or relatives at an event, then the competitor is responsible for their behaviour.

Safety

Important!

Safety is not just important in this competition – **SAFETY IS THE MOST IMPORTANT ASPECT**

As strange as it may sound, Combat Robotics is one of the safest sports/hobbies in the world. This is because great care is taken by builders and officials to ensure that everyone operates and competes in a safe environment. Competitors need to go the extra step to ensure that their own robots and working area are completely non-hazardous to themselves, to other competitors, or the general public.

WARNING

If a competitor is noticed by either an official, or another competitor violating safety rules then they will be ejected from the competition and possibly from future events.

Designs and builds need to be continually checked before competition day for anything that is likely to be personally dangerous for the competitor, fellow competitors, or the public. There are safety checks before the event and anything that looks like it could hurt someone personally will be removed from the event.

Activation of Weapons

IMPORTANT: Robots are only activated within the Arena or supplied Test box. Weapons are not to be activated away from the Arena or Test box for any reason – this includes the pit table. Activation will result in an immediate removal of competition and potential ban from future events. Drive systems can only be tested when on blocks.

Pre-Competition Safety Tests

Will your robot pass the Safety test?

Each robot will be safe to operate and pass a safety inspection by club officials at events. Check that your robot will pass the following safety checks before the event. An official at their discretion could give the competitor a time limit to “make good” a failed element of the safety test. If a Robot

cannot pass the following safety checks then it will result in the ejection of that robot from the event.

Safety Test will include:

- Check of weapon locking device for weapons. This ensures that while the robot is outside the arena or test box that its weapon cannot rotate, flip, lift or any other activity, until the lock is taken off. A lock is only taken off when instructed by an official and the robot is in the confines of the Arena or Test Box.
- Position of battery – the battery needs protection from a hit.
- Has wheel blocks for placing the robot on the pit table so that the wheels do not touch anything.
- Bot has an activation LED that is clearly visible from the outside of the robot and clear to the official while in the Arena.
- Has an appropriate switch/link that completely powers up/down the robot.
- The switch/link is positioned in such a way that it is safely activated or deactivated on entry or exit when in its default orientation (eg upright).
- The switch/link can be activated without putting the driver, competitor or official in any danger. Eg completely clear of the weapon.
- The Driver and pit crew have safety glasses
- Test of receiver failsafe. That is, the automatic shutdown within 20 seconds of weapon and drive train on loss of signal from the transmitter.
- Successfully driving to the centre of the arena spinning up of weapon (if applicable) and driving back to the exit door as per direction of the safety official.

Pit Area

The Pit Area is usually busy, so safety is paramount. Check that you are adhering to the following:

- Robots only be repaired/maintained at the designated pit area.
- Tools are BYO only
- Bring a mat to use as a working surface in the Pit Area.
- Children cannot be left unsupervised in the pit area.
- have all 240v equipment tested and tagged before use, and at one's own expense. MCR does have a member who is certified to tag equipment at most events but ensure MCR is contacted before the event for a booking time.
- be responsible for labelling and keeping all their own tools at any event.
- 240 Mains Power will be supplied in the pits
- No grinding, welding, Dremel work or any other manufacturing or maintenance activity that could put the competitor or other competitors in harm's way. Hot gluing and soldering are allowed if closely monitored and not left on after use.
- No activation of robot weapons in the pit area

Battery Charging

Battery Charging is allowed at the Pit area. However, batteries need to be charged in a professional LiPo Battery charging bag (can be purchased from Hobby stores). LiPo fires are energetic and while a

charging bag will not stop a fire, it will allow officials to remove the battery from the Competition building.

Batteries are to be:

- charged within a professional Battery charging bag
- charged by professional and recognised chargers
- certified and purchased sealed – not self built/configured.

Transmitter / Receivers

Transmitter/Receivers are to operate on 2.4GHz and are using recognised modern professional protocols. If you are uncertain of your Transmitter/Receiver then contact MCR Committee.

As specified in the safety checks, each receiver must be capable of a Failsafe. That is, if the transmitter signal is lost, the receiver will instruct connected Weapon and Drive system to power down.

Competition

All competition rules are listed in the Match Rules section below.

Melbourne Combat Robotics (MCR) Match Rules:

Version: 2.1 May 2022

These rules are based on Sparc Tools and ARC Rulesets. This ruleset is aligned with the Adelaide Robot Combat (ARC).

Bot Load In and Activation:

In arenas where robot power up is possible with the driver not standing on the combat area preference will be given to that method.

- The combat area is defined as the region of the arena where active combat occurs. This would exclude gutters between whatever internal barricade exists in the arena and the arena walls.

Priority for load in is as follows:

- Least dangerous bot being activated by someone inside the combat area
- Most dangerous bot being activated by someone inside the combat area
- Least dangerous bot being activated by someone outside the combat area
- Most dangerous bot being activated by someone outside the combat area

The process for activating a robot is as follows:

- The robot's transmitter is placed on a designated table by the arena and left switched off.
- The arena is then opened from one side at a time only.
- Robot is placed in a stable position on the combat area with the drive wheels oriented such that when they come in contact with the combat area the direction of travel will be away from other robots, persons, and entry doors. If the robot has a weapon that is aimable it will be aimed at the wall furthest from the arena entry door.
- Weapon covers are removed.
- Main power is turned on.
- If separate, weapon power is turned on. This applies to both a separate power loop and non-electrical power systems. (ie. pneumatics)
- Weapon locks are removed.
- If the robot is being activated by a person inside the combat area, they then exit the arena. No movement or functional testing is permitted while anyone is on the combat area.
- Once both robots are in the arena, the arena is closed. After (and only after), transmitters may be switched on.
- After transmitters are switched on both robots may be driven to their starting squares and perform a brief weapon/drive system test if the drivers so desire.

After this, the referee will ask both drivers if they are ready and the fight will begin.

Post Fight Activities:

At the end of the fight both robots are to cease movement and if applicable, allow their weapon systems to de-energize. Once the weapon systems have been de-energized the judges may request that one or both robots demonstrate that either their drive or weapon system is still functional.

- Demonstration of drive system functionality will be done by the robot returning to its starting location.
- Demonstration of weapon system functionality will be done by the robot returning to its starting location and briefly applying power to the weapon system to show that it is still operational. The robot will not spin to full speed during this demonstration.

Once this is completed the robot deactivation and load out procedure can begin.

Bot Deactivation and Load Out:

In arenas where robot power down is possible with the driver not standing on the combat area preference will be given to that method. In the event of an unexpected situation the order in which robots are powered down may be altered by the referee.

- The combat area is defined as the region of the arena where active combat occurs. This would exclude gutters between whatever internal barricade exists in the arena and the arena walls.

Priority for load out is as follows:

- Most dangerous bot being deactivated by someone outside the combat area
- Least dangerous bot being deactivated down by someone outside the combat area
- Most dangerous bot being deactivated down by someone inside the combat area
- Least dangerous bot being deactivated down by someone inside the combat area

The process for deactivating a robot is as follows:

- All robot transmitters are turned off and left on the designated table by the arena.
- The arena is then opened from one side at a time only.
- Weapon system is disabled. This includes any applicable weapon locks, power cut-off and venting. The exact order of this procedure will be left to the discretion of the builder as differing designs may necessitate different safe shutdown procedures.
- Main power is turned off.
- Weapon covers are reinstalled.
- If the robot is able to be removed from the arena without a cart/assistance it may be

removed at this time, otherwise robots will be removed from the arena once all robots have had their weapon locks installed and are powered down.

Emergency Deactivation Procedure:

In the event of an emergency (for example: one or more robots on fire) the standard procedure does not apply. The following attempts to address the vast majority of possible situations that are likely to occur:

- One robot is burning and the other is mobile
 - The mobile robot is to move to the wall furthest from the arena entry door and align its drive wheels parallel with the wall. If the robot has an active weapon it is to immediately begin dissipating stored energy (spinning down, release for spring actuated weapons, etc) and if possible, bring it next to or into contact with the wall it is aimed at.
 - Once the working robot is in position the arena marshal will enter the arena and extinguish the fire, then if possible, remove the robot from the arena.
 - The operator of the non-burning robot may then proceed with normal load out procedures.

- One robot is burning and the other is immobile
 - If the immobile robot has an active weapon, it is to immediately begin dissipating stored energy. (spinning down, release for spring actuated weapons, etc) If the robot retains some degree of mobility but cannot move in a reliable manner it will attempt to angle itself such that any weapons that are aimable are aimed at the wall furthest from the arena entry door.
 - Once the arena is able to be entered safely the arena marshal will enter the arena and extinguish the fire, then if possible, remove the robot from the arena.
 - The operator of the non-burning robot may then proceed with normal load out procedures.

- Both robots are burning
 - Both robots will, if applicable, immediately attempt to dissipate any stored energy systems and will attempt no other actions.
 - Once the arena is able to be entered safely the arena marshal will enter the arena and extinguish the fire, then if possible, remove both robots from the arena.

- One or more robots are burning during a rumble

- All mobile, non-burning robots will move to the closest arena wall that is not used to access the arena and begin dissipating stored energy.
 - All immobile robots will immediately begin dissipating stored energy and will perform no other actions unless they are able to rotate such that they are able to angle any aimable weapon systems at the wall furthest from the arena entry door.
 - Once the arena is able to be entered safely the arena marshal will enter the arena and extinguish the fire, then if possible, remove the robot from the arena.
 - If there is time left, the match will be allowed to resume.
- One or more robots are acting erratically/stuck on
 - The operator(s) of the robot(s) will turn off their transmitters to attempt to activate the robots failsafe.
 - If this works then normal load out procedures will resume.
 - In the event that the robot(s) are still acting erratically the robots will be allowed to drain their batteries until they are safe to approach.
 - Should a robot in the arena still be fully functional, no weapon system be active on the malfunctioning robot and all involved operators agree to it the operator of the still working robot may attempt to pin and prop up the malfunctioning robot such that its wheels are no longer in contact with the ground. The operator of the malfunctioning robot will then be allowed to power off their robot. Once powered off they will exit the arena and the robot that was pinning the malfunctioning robot will be allowed to go through normal load out procedures. The malfunctioning robot will then complete its load out procedures

Emergency Match Stoppage Procedure:

In the event of an arena breach, damage to the arena that renders it unsafe, or any other event that is otherwise judged a safety risk by event staff the match shall immediately be halted. For sufficiently large or loud arenas there should be a system in place to allow any event official to quickly act to stop the fight either by triggering a notification system or having direct communication with an official that does that won't be impacted by distance or arena noise.

It is strongly encouraged that there is both an audible (alarm, buzzer, air horn, or similar) and visual (arena lights off, flashing red lights, a deployed curtain, or similar) indication that the fight has been stopped to ensure that competitors are aware of the issue immediately. It is the responsibility of the team to ensure that the driver or another team member is watching and/or listening for these indicators.

If a competitor continues to fight after the referee has called for the fight to be stopped they will be disqualified. Repeated infractions will result in removal from the tournament. It is the responsibility of the driver to ensure that they respond promptly to the call to stop fighting.

Once fighting has ceased the robots will be deactivated. The deactivated robots may be left in place or moved to a safe location in or around the arena until a determination about the status of the fight is made. No work may be done on the bots during this time. The source of the safety issue will then be inspected to determine the appropriate action. Once the issue has been resolved a determination will be made as to whether or not the fight will resume. If possible, the fight will resume from the point where it was paused. If resuming the fight is determined to not be possible due to a safety concern or other issue the fight will be judged up until the point where it was stopped.

The safety of the crowd, competitors, and crew must always be considered when determining if any additional measures need to be taken beyond resolving the immediate safety issue.

Match Formats (not all applicable to all events):

• Round Robin

- Each robot faces each other robot in the weight class a single time. The robot with the greatest number of wins is declared the winner. In the event of a tie, the winner of the match between the two robots is declared the winner. Should more than two bots tie for the win the winner will be determined with a judged rumble. See Adelaide Robot Combat (ARC) Event section.
- If desired, a double round robin format can be used where each robot will face each other robot twice. The same criteria is used for determining a winner. Should the results necessitate it, a tie-breaker match may be run to determine which robot places higher.

• Single Elimination

- This format uses a standard single elimination bracket.

• Double Elimination (Standard format for classes with 6 or more robots entered)

- In a double elimination bracket all robots start in the winners bracket. The losing robot in a winners bracket match will move to the losers bracket. The losing robot in a losers bracket match is eliminated from the tournament.
- In this format, the robot that “wins” the losers bracket will need to defeat the robot that “wins” the winners bracket twice to win the overall event.

• Modified Double Elimination

- The format is the same as a double elimination bracket however the overall final is treated as single elimination, meaning that if the robot that “wins” the losers bracket

will only have to defeat the robot that “wins” the winners bracket a single time to win the overall event.

- Other

- Any match formats used not described above will be the responsibility of the host event to clearly describe.

Match Frequency:

- Robots weighing between 150g and 6lb will be given a minimum of 20 minutes between matches.
- Robots weighing greater than 6lb will be given a minimum of 30 minutes between matches.

Match Duration:

The standard match duration for 150g-6lb robots is 3 minutes. The standard match duration for robots weighing more than 6lbs is 3 minutes. The standard match duration for a rumble in any weight class is 5 minutes.

(Option) The match duration for 150g-6lb robots is 2 minutes.

Combat Events:

Antweight Class

Events run the following league types in Antweight classes:

- A League. open league, available to any registered Antweight
- B League. A restricted league for beginners and unique creations. Ideal for beginners with new robots. This league follows plastic class rules.

Beetleweight Class

- A League. open league, available to any registered Beetleweight

Other classes:

For other classes, please contact the event organisers.

Class Division

Each of Leagues run in both a round robin and single elimination format (depending on numbers, this may differ).

- All registered robots get randomly divided up into multiple round robin groups.
- Each match is scored and points are tallied during the tournament.

Points

0 points for a loss. 1 point each for a draw. This removes the need for judges during the round robin phase.

- The two highest scored fighters will enter a single elimination finals tournament. A deciding match will determine who enters the tournament if there are tied round robin scores. A count back (who beat the other previously) can also determine who will go through to the finals.
- Single elimination matches will be judged in the event of a draw.

Note: A robot may have different drivers for different tournaments (ie. A team that has one driver in A League and a different driver in B League). However, the nominated driver must not change during a tournament unless special circumstances require otherwise.

Un-sticks:

Matches will be paused to separate robots in the event that they become stuck together in the arena. Robots that become stuck together will be allowed 10 seconds to attempt to separate (this will be monitored by the referee). If they are not able to do so an un-stick will be called for by the referee. An un-stick can only be called for by the drivers or referee and the referee has the final say on whether or not the un-stick will be granted based upon the events un-stick rules.

No modifications or repairs are allowed during an unstick. During an un-stick the match will be paused by the referee. The referee or safety marshal will perform the un-stick and then resume the match once the robots have been separated following a three second countdown. Drivers are expected to follow all instruction from the referee during the un-stick.

Additional Un-stick options:

- “The Arena is a Hazard” - No un-sticks for a single robot being immobilized due to terrain independent of cause. This rule is valid for events.
- “Single un-stick” - Each robot gets one un-stick independent of cause. Only the driver of the stuck robot can call for an un-stick in this situation. With multi-bots, all parts of the multi-bot are only given a single un-stick.
- “Modified single un-stick” (Standard) - Each robot gets one un-stick but only if the opposing robot was not the cause for their immobilization. For example, if a robot were to get itself stuck on the arena wall somehow, they would get an unstick. If the robot were placed against the wall in a manner that prevented operation, (ie, rammed into a stuck position,

weapon contact causes a stuck position, lifted into position, etc) they would not get an un-stick. The referee will determine if this applies.

Only the driver of the stuck robot can call for an un-stick in this situation. As with “single un-stick” all parts of a multi-bot share a single un-stick.

Knock-outs:

When a robot has ceased moving in a controlled manner but has not tapped out the referee will begin a 10 second countdown. If the robot is unable to demonstrate controlled translational movement before the countdown ends it will be declared the loser by KO. If during this time the robot is able to show controlled translational movement or if the opposing robot attacks it the countdown will cease. This means that a “dead” robot will not be counted out should the opposing robot continue to attack and the match will not end until the match timer expires or one robot taps out.

A bot with one side of its drivetrain disabled will not be counted out if it can demonstrate controlled translational movement. Controlled translational movement is defined as being able to traverse in a manner such that the net movements of the robot are in a linear direction.

In the case of multi-bots, the countdown will begin when greater than 75% of the mass of the multi-bot is unable to move. For multi-bots with an even number of robots (2, 4, etc...) and equal weights for each portion the team will identify which are considered to be the heaviest.

In the event of a simultaneous knock-out and if no judges are used for the match, this will be declared a draw. Both robots will be placed in their standard orientation on the combat area by the arena marshal/referee and allowed an attempt to demonstrate controlled movement. If both robots are able to function the match will resume. If one robot is able to function that robot will be declared the winner. If neither robot is able to function the match will go to the judges.

(Option) Should the battery of a robot become exposed the match will be halted and the robot with the exposed battery will lose by TKO. This rule is valid for ARC events.

Death Zones/Pits/Push-outs:

If the arena is equipped with a **Death Zone/Pit/Push-out** or similar hazard a robot entering this area in a one on one match will result in the end of the match and a loss for the robot that first entered the area. In a rumble any robots entering the area will be eliminated from the rumble and are to cease the operation of weapon systems immediately.

(Option) The death zone may be used as an immobilization zone instead, allowing the robot a chance to attempt to escape while it is being counted out. If the robot is able to escape before being counted out the match will continue as normal.

In the event that both robots enter the death zone simultaneously they will be returned to the combat area and the match will resume. A robot that places its opponent in the death zone must be able to do so without also becoming stuck itself. If it is not able to separate from the other robot this

will be treated as simultaneous entry. If both robots enter a pit simultaneously, the referee will determine if this was caused by one of the robots and declare that robot the winner. If determined that no single bot caused them both to enter, the referee will declare the match a draw. The referee's ruling will be final.

Pinning/Lifting:

Any robot pinning or lifting their opponent may only continue to pin or lift them for 10 seconds at a time. After 10 seconds has elapsed the robot in control must release the opposing robot. If the robot in control is not able to release the opposing robot then the match will be halted and the robots will be separated (refer section 'Un-sticks').

- "Release" is defined as complete physical separation such that both robots are able to freely move away from their current location.
- Refusal to comply with the referee's request to release the opponent when the robots are not stuck together will result in forfeit of the match.

Tapping Out:

At any time during a match the robot operator may choose to tap out. Once an operator has tapped out combat will cease and the opposing robot will be declared the winner.

- Tapping out is done either by informing the referee that you are tapping out verbally or by using a designated tap out button or similar object should one be available.