7 GAME RULES: ROBOTS

7.1 Before/After the MATCH

G1. Know your ROBOT setup. When placed on the FIELD for a MATCH, each ROBOT must be:

A. in compliance with all ROBOT rules, i.e. has passed Inspection,
B. the only team-provided item left on the FIELD by the DRIVE TEAM,
C. confined to its STARTING CONFIGURATION,
D. positioned such that its BUMPERS are intersecting the infinite vertical volume created by the corresponding ALLIANCE’S INITIATION LINE, and
E. fully and solely supporting not more than three (3) POWER CELLS (as described in Setup.)

Violation: If fix is a quick remedy, the MATCH won’t start until all requirements are met. If it is not a quick remedy the offending ROBOT will be DISABLED and, at the discretion of the Head REFEREE, must be re-inspected.

Teams are encouraged to position ROBOTS such that it is clear to REFEREES that G1-D is not violated.

If a ROBOT is BYPASSED prior to the start of the MATCH, the DRIVE TEAM may not remove the ROBOT from the FIELD without permission from the Head REFEREE or the FIRST Technical Advisor (FTA).

G2. Teams may not enable their ROBOTS on the FIELD. Teams may not tether to the ROBOT while on the FIELD except in special circumstances (e.g. during TIMEOUTS, after Opening Ceremonies, before an immediate MATCH replay, etc.) and with the express permission from the FTA or a REFEREE.

Violation: YELLOW CARD.

FMS will not enable ROBOTS after the conclusion of the MATCH.

Teams are encouraged to consider rule C7 when developing their ROBOTS.

Tethering includes any wired or wireless connection used to electrically energize and/or control elements on the ROBOT. The safety of teams and volunteers in close proximity to ROBOTS and ARENA elements on the FIELD is of the utmost importance, therefore ROBOTS or ROBOT COMPONENTS may not be enabled in any way on the FIELD once the MATCH has concluded.

ROBOTS need to be safely transported off the FIELD and back to the pits after the MATCH, and there may be bystanders, doorways or height restrictions along the route.

7.2 During the MATCH

7.2.1 During AUTO Only

G3. During AUTO, no defense. During AUTO, a ROBOT’S BUMPERS may not break the plane of their ALLIANCE’S SECTOR (see Figure 3-3.)

Violation: FOUL. If contact with an opponent ROBOT, either directly or transitively through another ROBOT or POWER CELL, TECH FOUL per instance.
**G4. During AUTO, behind the lines.** During AUTO, DRIVE TEAM members in ALLIANCE STATIONS may not contact anything in front of the STARTING LINES, unless for personal or equipment safety.

Violation: **FOUL per item contacted.**

- Pointing, gesturing, or otherwise extending across the STARTING LINE such that contact is not made with carpet or other ARENA elements is not a violation of this rule.

- One example of an exception for equipment safety is if an OPERATOR CONSOLE starts to slide from, or has already fallen off of, the PLAYER STATION shelf. In that circumstance, DRIVE TEAM members may step forward to catch or pick it up off the ground and return it to the shelf.

**G5. During AUTO, let the ROBOT do its thing.** During AUTO, DRIVE TEAMS may not directly or indirectly interact with ROBOTS or OPERATOR CONSOLES unless for personal safety, OPERATOR CONSOLE safety, or pressing an E-Stop.

Violation: **FOUL and YELLOW CARD.**

### 7.2.2 POWER CELL Interaction

**G6. No more than five (5) POWER CELLS at a time.** ROBOTS may not have greater-than-momentary CONTROL of more than five (5) POWER CELLS at a time, either directly or transitively through other objects.

A ROBOT is in CONTROL of a POWER CELL if:

A. the POWER CELL is fully supported by the ROBOT,

B. the POWER CELL travels across the FIELD such that when the ROBOT changes direction, the POWER CELL travels with the ROBOT, or

C. the ROBOT is holding a POWER CELL against a FIELD element in attempt to guard or shield it.

Violation: **FOUL per additional POWER CELL. If egregious, YELLOW CARD.**

- Egregious examples include, but are not limited to:

  a. CONTROLLING ten (10) POWER CELLS
  b. Repeatedly moving more than five (5) POWER CELLS across one half of the FIELD to the other.

**G7. Keep POWER CELLS in bounds.** ROBOTS may not intentionally eject POWER CELLS from the FIELD other than through the POWER PORT.

Violation: **FOUL per POWER CELL.**
G8. **POWER CELLS:** use as directed. **ROBOTS** may not deliberately use **POWER CELLS** in an attempt to ease or amplify the challenge associated with **FIELD** elements.

*Violation: TECH FOUL per POWER CELL.*

Examples include, but are not limited to:

a. shooting **POWER CELLS** at **HANGING ROBOTS**

b. pushing/placing **POWER CELLS** into the opponent’s **TRENCH** to make it harder to pass through it

c. placing/shooting **POWER CELLS** onto the opponent’s **CONTROL PANEL**

7.2.3 **Zone Specific Restrictions**

G9. **No full court shots.** A **ROBOT** whose **BUMPERS** are fully contained by their **SECTOR** may not cause **POWER CELLS** to travel into or through their opponent’s **SECTOR**.

*Violation: TECH FOUL per POWER CELL.*

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**Figure 7-1 POWER CELL movement limitations**

**REFEREES** are not expected to track the movement of **POWER CELLS** throughout the **MATCH**. Teams are encouraged to launch **POWER CELLS** such that it is clear to **REFEREES** that **G9** is not violated.

For the purposes of **G9**, “travel” means “to move through the air, bounce across the floor, or roll.” A **POWER CELL** is no longer “travelling” once it stops, contacts an opponent **ROBOT**, or is **CONTROLLED** by a **ROBOT** on their **ALLIANCE**. The cause (i.e. responsibility for) a **POWER CELL** “travelling” may transfer from **ROBOT** to **ROBOT** as assessed by the **REFEREE**.
7.2.4 ROBOT Restrictions

G16. **Keep your BUMPERS low.** BUMPERS must be in the BUMPER ZONE (see R18) during the MATCH, unless during the ENDGAME and

A. a ROBOT’S BUMPERS are intersecting its RENDEZVOUS POINT or

B. a ROBOT is supported by a partner ROBOT whose BUMPERS are intersecting its RENDEZVOUS POINT.

Violation: FOUL. If strategic, RED CARD.

An example of a strategic violation of G16 includes, but is not limited to, hitting other ROBOTS with the ROBOT frame.

G17. **Tall ROBOTS not allowed.** ROBOT height, as measured when it’s resting normally on a flat floor, may not exceed 45 in. (~114 cm) above the carpet during the MATCH, with the exception of ROBOTS intersecting their ALLIANCE’S RENDEZVOUS POINT during the ENDGAME.

Violation: TECH FOUL. If the extension blocks a goal, blocks an opponent’s shot, or scores a goal, additional TECH FOUL per instance.

This measurement is intended to be made as if the ROBOT is resting on a flat floor, not relative to the height of the ROBOT from the FIELD carpet.

For example, a ROBOT that is at an angle while traversing a BOUNDARY may actually exceed the height limit when compared to the carpet of the FIELD.

G18. **Don’t overextend yourself.** ROBOTS may not extend more than 12 inches (~30 cm) beyond their FRAME PERIMETER.

Violation: FOUL. If egregious, RED CARD.

Examples of compliance and non-compliance of G18 are shown in Figure 7-3.

Yellow bars represent the limits of the FRAME PERIMETER and are drawn in the same orientation of the ROBOT’S FRAME PERIMETER. Green bars represent a measured
extension from the FRAME PERIMETER that does not violate G18. Red bars represent a measured extension from the FRAME PERIMETER that exceeds the limit in G18). ROBOTS A and C violate G18, whereas ROBOT B does not.

Figure 7-4 Examples of G18 compliance and non-compliance

Egregious examples of G18 violations include:

a. extending more than 12 inches (~30 cm) beyond the FRAME PERIMETER to score a POWER CELL
b. extending more than 12 inches (~30 cm) beyond the FRAME PERIMETER to score a HANG
c. expanding to block opponent access to a FIELD element, e.g. GENERATOR SWITCH or POWER PORT
d. expanding into the BOTTOM PORT to disrupt the scoring mechanism

G19. Keep it together. ROBOTS may not intentionally detach or leave parts on the FIELD.

Violation: RED CARD.

G20. Keep your BUMPERS together. BUMPERS may not fail such that a segment completely detaches, any side of a ROBOT’S FRAME PERIMETER is exposed, or the team number or ALLIANCE color are indeterminate.

Violation: DISABLED.

7.2.5 ROBOT to ROBOT Interaction

G21. There’s a 5-count on pins. ROBOTS may not PIN an opponent’s ROBOT for more than five (5) seconds. A ROBOT is PINNING if it is preventing the movement of an opponent ROBOT by contact, either direct or transitive (such as against a FIELD element). A ROBOT is considered PINNED until the ROBOTS have separated by at least six feet from each other or either ROBOT has moved six feet from where the PIN initiated, whichever comes first. The PINNING ROBOT(S) must then wait for at least three (3) seconds before attempting to PIN the same ROBOT again.

Violation: FOUL, plus an additional TECH FOUL for every five (5) seconds in which the situation is not corrected.

A team’s desired direction of travel is not a consideration when determining if a ROBOT is PINNED.
Some examples of violations of this rule include, but are not limited to:

- an extension damages a COMPONENT inside an opponent ROBOT’S FRAME PERIMETER
- an extension powers off an opponent’s ROBOT
- an extension relieves an opponent’s ROBOT’S air pressure.
- a ROBOT that unintentionally extends outside its FRAME PERIMETER while tipping and damages a COMPONENT inside an opponent ROBOT’S FRAME PERIMETER

At the conclusion of the MATCH, the HEAD REFEREE may elect to visually inspect a ROBOT to confirm violations of G25 made during a MATCH and remove the violation if the damage cannot be verified.

For the purposes of G25, “initiate direct contact” requires movement towards an opponent ROBOT.

In a collision, it’s possible for both ROBOTS to initiate direct contact.

### 7.2.6 FIELD Interaction

**G26. Be careful what you interact with.** ROBOTS and OPERATOR CONSOLES are prohibited from the following actions with regards to interaction with ARENA elements. Items A–C exclude POWER CELLS, HANDLE, and the ALLIANCE’S CONTROL PANEL. Item G excludes the HANDLE.

- A. Grabbing
- B. Grasping
- C. Attaching (including the use of a vacuum or hook tape to anchor to the FIELD carpet and excluding use of the PLAYER STATION hook-and-loop tape, plugging in to the provided power outlet, and plugging the provided Ethernet cable into the OPERATOR CONSOLE)
- D. Deforming
- E. Becoming entangled
- F. Damaging
- G. Suspending from

Violation: MATCH will not start until the situation is corrected. If during a MATCH, TECH FOUL. If during a MATCH and longer than momentary or repeated, YELLOW CARD. If offense is via a ROBOT and the Head REFEREE determines that further damage is likely to occur, offending ROBOT will be DISABLED. Corrective action (such as eliminating sharp edges, removing the damaging MECHANISM, and/or re-Inspection) may be required before the ROBOT will be allowed to compete in subsequent MATCHES.

POWER CELLS are expected to undergo a reasonable amount of wear and tear as they are handled by ROBOTS, such as scratching or marking. Gouging, tearing off pieces, or routinely marking POWER CELLS are violations of this rule.