

8 GAME RULES: ROBOTS

8.1 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 (for exceptions regarding Practice MATCHES, see the [Inspection & Eligibility Rules](#) section),
 - B.** the only item left on the FIELD by the DRIVE TEAM,
 - C.** confined to its STARTING CONFIGURATION,
 - D.** set on their HAB PLATFORM, and
 - E.** supporting not more than one (1) GAME PIECE (as described in the [Setup](#) section).

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.

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. ROBOTS must be removed from the FIELD by hand (i.e. no enabling, power, etc.).** ROBOTS will not be re-enabled after the conclusion of the MATCH, nor will teams be permitted to tether to the ROBOT 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.

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 energized or powered in any way on the FIELD once the MATCH has concluded.

Keep in mind that 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.

8.2 DURING THE MATCH

8.2.1 ONLY DURING THE SANDSTORM PERIOD

- G3. No defense.** During the SANDSTORM PERIOD, a ROBOT may not cross the FIELD such that its BUMPERS break the plane defined by their opponent's CARGO SHIP LINE.

Violation: TECH FOUL

8.2.2 GAME PIECE INTERACTION

- G4. One GAME PIECE at a time.** ROBOTS may not have greater-than-momentary or repeated control, i.e. exercise greater-than-momentary or repeated influence, of more than one (1) GAME PIECE at a time, either directly or transitively through other objects. A GAME PIECE that is at least partially supported by a ROCKET or CARGO SHIP is not considered controlled by the ROBOT.

Violation: FOUL per additional GAME PIECE. If strategic, YELLOW CARD.



If a GAME PIECE becomes lodged in or on a ROBOT, it is considered controlled by the ROBOT. It is important to design your ROBOT so that it is impossible to inadvertently or unintentionally control more than the allowed maximum.

Example 1: If a ROBOT controls two (2) GAME PIECES and then releases them all in a way that both GAME PIECES are in scoring position, the team is issued a YELLOW CARD.

Example 2: If a CARGO is stuck on a ROBOT and that ROBOT picks up a HATCH PANEL, they are issued a FOUL per G4. If they place that HATCH PANEL and then pick up another HATCH PANEL, they are issued another FOUL. Continuing game play in this manner (i.e. not taking advantage of carrying more than one (1) GAME PIECE) would generally not be considered a strategic violation.

Example 3: A ROBOT controlling one (1) GAME PIECE that briefly contacts several CARGO in close proximity causing them to scatter would generally not be considered in violation of G4.

- G5. Don't mess with opponents' scored GAME PIECES.** A ROBOT may not remove a GAME PIECE from an opponents' ROCKET/CARGO SHIP. GAME PIECES which become dislodged because of incidental contact with the ROCKET/CARGO SHIP are not considered a violation of this rule.

Violation: FOUL per GAME PIECE de-scored and opponents are awarded one (1) Complete ROCKET Ranking Point if neither of their ROCKETS are completed at T-minus 0s.

- G6. No throwing HATCH PANELS.** ROBOTS may not shoot HATCH PANELS into the air in a way that's prohibited in R6, kick them across the floor using an active MECHANISM, or eject them across the floor in a forceful way (i.e. HATCH PANEL is caused to move a significant distance).

Violation: RED CARD.

- G7. Keep GAME PIECES in bounds.** ROBOTS may not intentionally eject GAME PIECES from the FIELD.

Violation: FOUL per GAME PIECE.

- G8. GAME PIECES: use as directed.** ROBOTS may not deliberately use GAME PIECES in an attempt to ease or amplify the challenge associated with FIELD elements.

Violation: FOUL per GAME PIECE. Repeated at any point during the event or egregious violations of this rule are likely to escalate rapidly to YELLOW or RED CARDS.

Examples include, but are not limited to:

- stacking HATCH PANELS to decrease the rise of the HAB PLATFORM steps
- corralling CARGO in front of an opponent's LOADING STATION to make it harder for them to retrieve GAME PIECES

8.2.3 ZONE SPECIFIC RESTRICTIONS

- G9. One (1) defender at a time.** No more than one ROBOT may be positioned such that its BUMPERS break the plane defined by or are completely beyond the opponent's CARGO SHIP LINE.

The exception to this rule is if an additional ROBOT



- A. is forced to cross the opponent's CARGO SHIP LINE by an opponent ROBOT (e.g. it is pushed over the opponent's CARGO SHIP LINE by an opponent in a defensive effort to prevent them from scoring a CARGO in a ROCKET), and
- B. makes a dedicated effort to cross back over the CARGO SHIP LINE until no more than one ROBOT is positioned such that its BUMPERS break the plane defined by or are completely beyond the opponent's CARGO SHIP LINE.

Violation: FOUL, plus an additional FOUL for every five (5) seconds in which the situation is not corrected. If G10 is also being violated, additional FOUL escalates to TECH FOUL.

Only one (1) 'five-count' will be maintained at a time for G9, G10, and G18. For violations of G9/G10, the first count started will be maintained and a FOUL or TECH FOUL will be assessed at each five-second interval depending on whether one or both rules are being violated. If G18 is also violated, REFEREES are instructed to disregard G9/G10 counts to focus on the pin. Attempts to intentionally manipulate this in order to avoid G9/G10 penalties may be subject to YELLOW/RED CARDS for egregious behavior.

- G10. On defense, rein it in.** No part of a ROBOT, except its BUMPERS, may be outside its FRAME PERIMETER if its BUMPERS are completely beyond its opponent's CARGO SHIP LINE.

The exception to this rule is if the ROBOT

- A. is forced to cross the opponent's CARGO SHIP LINE by an opponent ROBOT (e.g. it is pushed over the opponent's CARGO SHIP LINE by an opponent in a defensive effort to prevent them from scoring a CARGO in a ROCKET), and
- B. makes a dedicated effort to reposition itself such that
 - i. its BUMPERS are not completely beyond its opponent's CARGO SHIP LINE or
 - ii. the ROBOT is contained to its FRAME PERIMETER.

Violation: FOUL, plus an additional FOUL for every five (5) seconds in which the situation is not corrected. If G9 is also being violated, additional FOUL escalates to TECH FOUL.

- G11. No throwing CARGO on defense.** A ROBOT with its BUMPERS breaking the plane defined by or completely beyond the opponent's CARGO SHIP LINE may not shoot CARGO into the air, kick it across the floor using an active MECHANISM, or eject it across the floor in a forceful way (i.e. CARGO is propelled a significant distance).

Violation: FOUL per CARGO.

- G12. Duck in the HAB ZONES.** A ROBOT with its BUMPERS fully in either HAB ZONE may not extend above the ALLIANCE STATION WALL, i.e. more than 6 ft. 6 in. (~198 cm) above the carpet.

Violation: FOUL. If repeated in a MATCH or while climbing the HAB PLATFORM, YELLOW CARD.



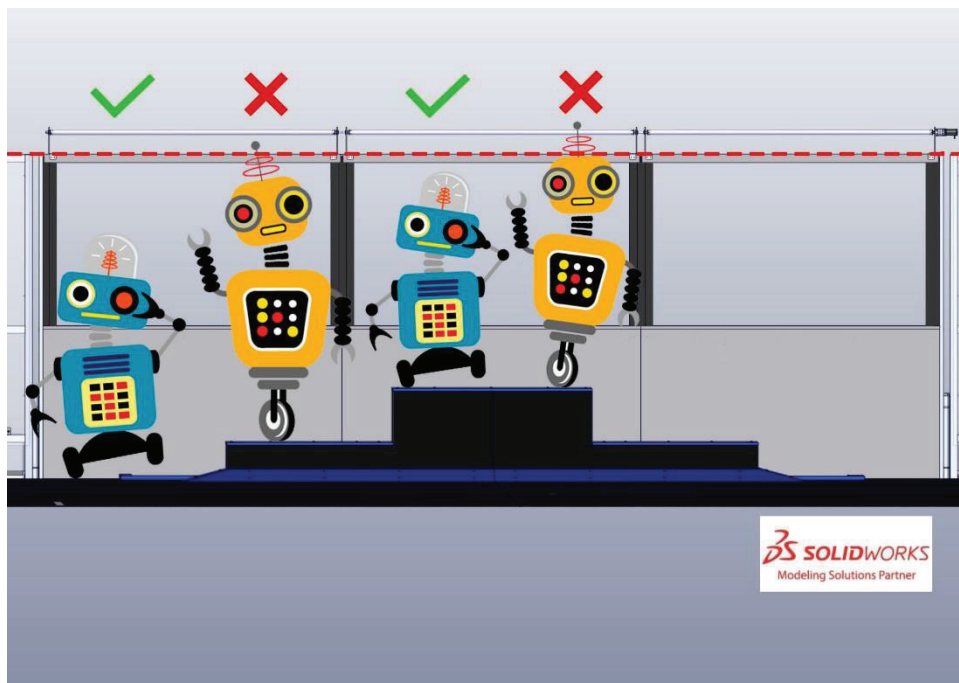


Figure 8-1 ROBOT height limitations in the HAB ZONE

- G13. Opponents in their HAB ZONE are off-limits.** A ROBOT may not contact an opponent ROBOT if that opponent ROBOT'S BUMPERS are fully in their HAB ZONE.

Violation: FOUL. If this violation occurs during the last 30 seconds of the MATCH, the contacted opponent ROBOT, and all partner ROBOTS it's fully supporting, are considered to have CLIMBED to LEVEL 3 at the end of the MATCH.

- G14. Don't climb on each other unless in the HAB ZONE.** A ROBOT may not be fully supported by a partner ROBOT unless the supporting ROBOT is at least partially in its HAB ZONE.

Violation: YELLOW CARD.

8.2.4 FIELD INTERACTION

- G15. Be careful about what you interact with.** DRIVE TEAMS, ROBOTS, and OPERATOR CONSOLES are prohibited from the following actions with regards to interaction with ARENA elements. Items A-D exclude GAME PIECES and the HAB PLATFORM.

- A.** Grabbing (excluding DRIVE TEAM interaction with ARENA elements in their areas)
- B.** Grasping (excluding DRIVE TEAM interaction with ARENA elements in their areas)
- C.** Attaching (including the use of 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 in to the OPERATOR CONSOLE)
- D.** Hanging
- E.** Deforming
- F.** Becoming entangled
- G.** Damaging
- H.** Repositioning GAME PIECE holders (incidental movement where their general position is unchanged is an exception)



Violation: If prior to MATCH, and situation can be corrected quickly, it must be remedied before the MATCH will start. If during a MATCH, FOUL. If during a MATCH and extended 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.

GAME PIECES 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, popping, or routinely marking GAME PIECES are violations of this rule. Materials that aggressively wear or leave behind residue or debris on the HATCH PANEL'S loop tape may hinder the natural behavior of the loop tape and thus violate G15. Humans causing GAME PIECE wear and tear, e.g. deforming a CARGO, are subject to a CARD per C1.

There are no rules that prohibit contact with the SANDSTORM'S black out material, however contact that prevents the SANDSTORM from working properly (e.g. retracting at T-minus 135s) is considered damaging and a violation of G15.

- G16. Don't touch opponents' ROCKETS at the end of the MATCH.** During Qualification MATCHES, ROBOTS may not contact opponents' ROCKETS starting at T-minus 20s. Incidental contact, i.e. unintentional contact where opponents' actions are not impeded (e.g. minor contact while driving by the ROCKET), is an exception to this rule.

Violation: FOUL and opponents are awarded one (1) Complete ROCKET Ranking Point if neither of their ROCKETS are completed at T-minus 0s.

8.2.5 ROBOT TO ROBOT INTERACTION

- G17. If an opponent's down, back off.** Fallen (i.e. tipped over) ROBOTS attempting to right themselves (either by themselves or with assistance from a partner ROBOT) have one ten (10) second grace period in which they may not be contacted by an opponent ROBOT. This protection lasts for either ten (10) seconds or until the protected ROBOT has completed the righting operation, whichever comes first.

Violation: FOUL. If intentional, YELLOW CARD.

- G18. There's a 5-count on pins.** ROBOTS may not pin an opponent's ROBOT for more than five (5) seconds. A ROBOT will be considered pinned until the ROBOTS have separated by at least six (6) feet. The pinning ROBOT(s) must then wait for at least three (3) seconds before attempting to pin the same ROBOT again. Pinning is transitive through other objects. If the pinned ROBOT chases the pinning ROBOT upon retreat, the pinning ROBOT will not be penalized, and the pin will be considered complete.

Violation: FOUL, plus an additional FOUL for every five (5) seconds in which the situation is not corrected. If G9 and/or G10 are also being violated, additional FOUL escalates to TECH FOUL. If extended, RED CARD.

There is no FIRST Robotics Competition specific definition of pin, so a general definition applies; "to prevent or stop something from moving." As a result, contact is not required for pinning to occur.

For example, a Red ROBOT parked such that a Blue ROBOT is against its Blue ROCKET and the Red CARGO SHIP LINE (while the opponent's partner is already on defense per G9) could be considered pinning because the opponent ROBOT cannot cross the Red CARGO SHIP LINE without violating G9.



Generally, pins that exceed fifteen (15) seconds are considered extended, regardless of a pinning ROBOT's mobility.

G19. Don't tear others down to lift yourself up. Strategies aimed at the destruction or inhibition of ROBOTS via attachment, damage, tipping, or entanglements are not allowed.

Violation: TECH FOUL and YELLOW CARD. If harm or incapacitation occurs as a result of the strategy, RED CARD

For example, use of a wedge-like MECHANISM to tip ROBOTS is a violation of G19. MECHANISMS outside the FRAME PERIMETER are particularly susceptible to causing such damage, drawing this penalty, and/or drawing penalties associated with violations of G19.

Teams are encouraged to be cautious in their use of such MECHANISMS when engaging in ROBOT to ROBOT MATCH play.

G20. Stay out of other ROBOTS. Initiating deliberate or damaging contact with an opponent ROBOT on or inside the vertical extension of its FRAME PERIMETER, including transitively through a GAME PIECE, is not allowed.

Violation: TECH FOUL and YELLOW CARD.

High speed accidental collisions may occur during the MATCH and are expected. Generally, ROBOTS extend elements outside of the FRAME PERIMETER at their own risk.

A ROBOT with an element outside its FRAME PERIMETER may be penalized under G20 if it appears they are using that element to purposefully contact another ROBOT inside its FRAME PERIMETER.

The "deliberate or damaging" clause in G20 refers specifically to whether the actual contact within/on an opponent's FRAME PERIMETER is deliberate or damaging, not with any actions/game play/intentions leading up to that contact.

Generally, if, in the judgement of the REFEREE, contact on/within a ROBOT'S FRAME PERIMETER is neither deliberate nor damaging, G20 is not violated. Examples include

- a ROBOT hits an opponent to move it away from its ROCKET and tilts in a way that part of it swings, accidentally in the REFEREE'S judgement, in to an opponent's FRAME PERIMETER and makes contact but causes no damage.
- a ROBOT tries to push an opponent by hitting them on their BUMPER, but because of the impact, accidentally (in the REFEREE'S judgement) rolls on top of them such that their wheels are in contact with elements inside the opponent's FRAME PERIMETER but causes no damage.

An example of a violation of G20 is if a ROBOT reaches inside an opponent's FRAME PERIMETER and uses their arm to hit the opponent's gripper to make the opponent drop their GAME PIECE.

8.2.6 ROBOT RESTRICTIONS

G21. Keep it together. ROBOTS may not intentionally detach or leave parts on the FIELD.

Violation: RED CARD



This rule is not intended to penalize ROBOTS that encounter accidental breakage (e.g. a failed MECHANISM that falls off), as those actions are not intentional.

- G22. 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.

- G23. Keep your BUMPERS low.** BUMPERS must be in the BUMPER ZONE (see R25) during the MATCH unless a ROBOT is completely in its HAB ZONE or supported by a ROBOT completely in its HAB ZONE. A ROBOT is "completely in its HAB ZONE" if its BUMPERS are entirely between its ALLIANCE WALL and the vertical plane defined by its HAB LINE.

Violation: FOUL. If strategic, RED CARD.

An example of a strategic violation of G23 includes, but is not limited to, hitting other ROBOTS with the ROBOT frame.

- G24. Don't overextend yourself.** ROBOTS may not extend more than 30 in (~76 cm). beyond their FRAME PERIMETER (see Figure 8-2).

Violation: FOUL. If strategic (e.g. expansion results in scoring a GAME PIECE), RED CARD.

Examples of compliance and non-compliance of G24 are shown in Figure 8-2.

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 has not been exceeded. Red bars represent a measured extension from the FRAME PERIMETER that has exceeded the limit in G24). ROBOTS A and C violate G24, whereas ROBOT B does not.

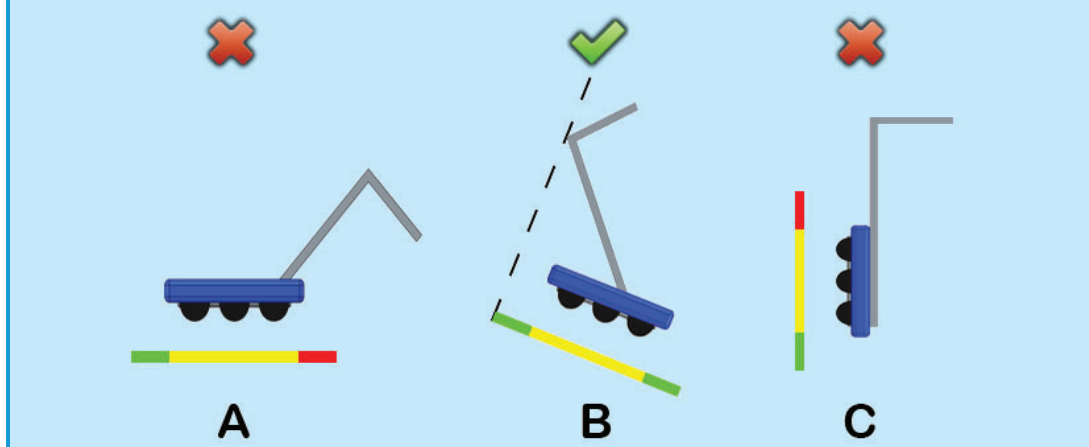


Figure 8-2 Examples of G24 compliance and non-compliance.



