

7 GAME RULES: ROBOTS

7.1 ROBOT Restrictions

- G101** ***Dangerous ROBOTS: not allowed.** ROBOTS whose operation or design is dangerous or unsafe are not permitted.

Violation: If before the MATCH, the offending ROBOT will not be allowed to participate in the MATCH. If during the MATCH, the offending ROBOT will be DISABLED.

Examples include, but are not limited to:

- uncontrolled motion that cannot be stopped by the DRIVE TEAM,
- ROBOT parts “flailing” outside of the FIELD,
- ROBOTS dragging their battery, and
- ROBOTS that consistently extend outside the FIELD.

- G102** ***ROBOTS, stay on the FIELD during the MATCH.** ROBOTS and anything they control, e.g. GAME PIECES, may not contact anything outside the FIELD except for MOMENTARY incursions into PORTALS.

Violation: DISABLED.

Please be conscious of REFEREES and FIELD STAFF working around the ARENA who may be in close proximity to your ROBOT.

- G103** ***Keep your BUMPERS low.** BUMPERS must be in the BUMPER ZONE (see [R402](#)) during the MATCH.

Violation: FOUL. If REPEATED or greater than MOMENTARY, DISABLED.

- G104** ***Keep your BUMPERS together.** BUMPERS may not fail such that a segment completely detaches, any corner (as defined in [R401](#)) of a ROBOT’S FRAME PERIMETER is exposed, or the team number or ALLIANCE color are indeterminate.

Violation: DISABLED.

- G105** ***Keep it together.** ROBOTS may not intentionally detach or leave parts on the FIELD.

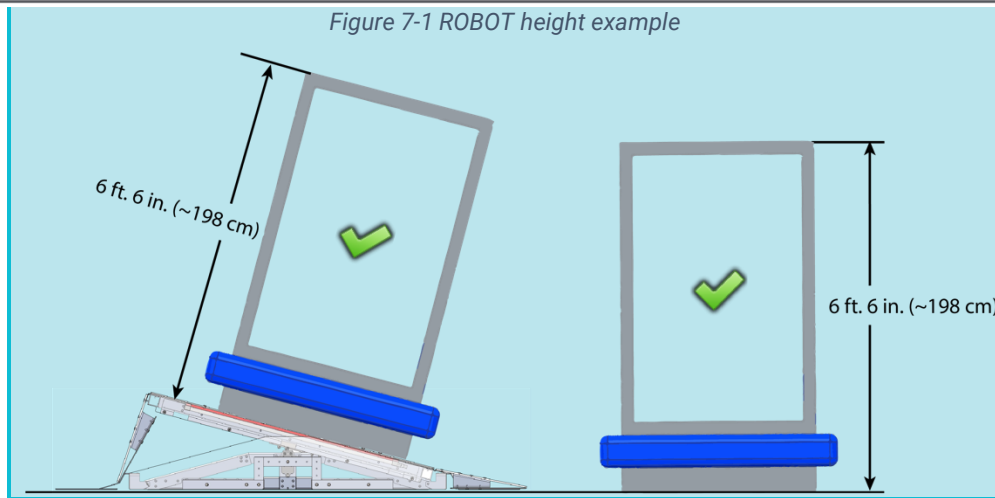
Violation: RED CARD.

- G106** **Tall ROBOTS not allowed.** ROBOT height, as measured when it’s resting normally on a flat floor, may not exceed 6 ft. 6 in. (~198 cm)) above the carpet during the MATCH.

Violation: FOUL.

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 driving over something may actually exceed the height limit when compared to the carpet of the FIELD.



G107 Don't overextend yourself. ROBOTS may not extend beyond their FRAME PERIMETER in more than 48 in. (~122 cm). MOMENTARY and inconsequential extensions beyond 48 in. (~122 cm) are an exception to this rule.

Violation: FOUL. TECH FOUL if the over-extension scores a GAME PIECE. If the over-extension results in the ROBOT blocking all access to a FIELD ELEMENT, RED CARD

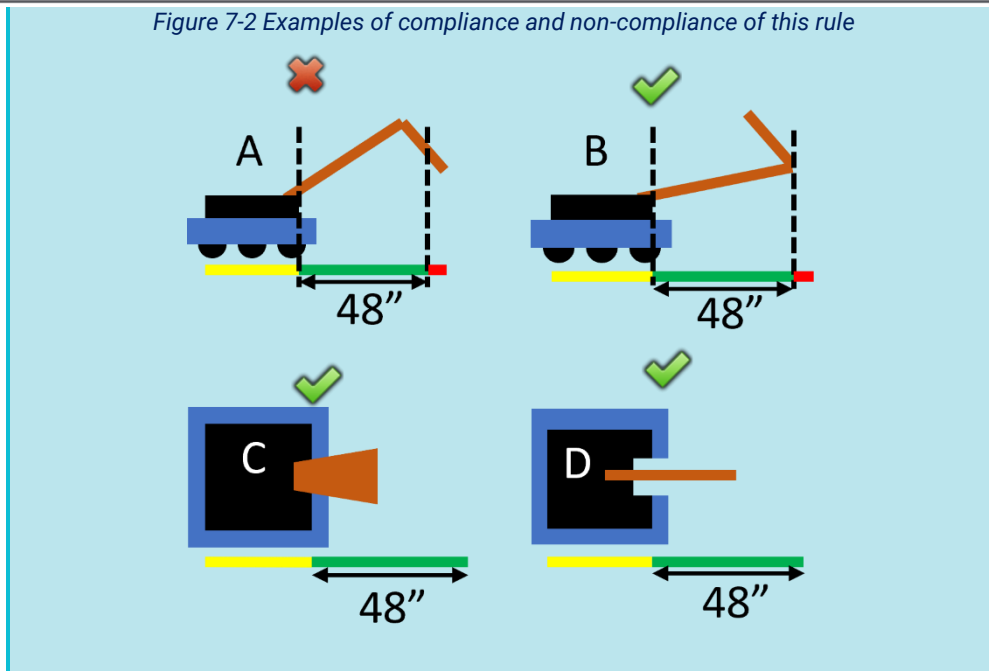
MOMENTARY and inconsequential extensions include a wire or cable tie swinging out of the FRAME PERIMETER, including while an extension is deployed.

Examples of compliance and non-compliance of this rule are shown in Figure 7-2.

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 does not exceed the limit defined in this rule. Red bars represent a measured extension from the FRAME PERIMETER that exceeds the limit in this rule.

- ROBOT A violates this rule for having an extension that is too long
- ROBOT B does not violate this rule
- ROBOT C does not violate this rule
- ROBOT D does not violate this rule because its extension is only extending in one direction despite edges that are non-perpendicular to the ROBOT BUMPERS

Figure 7-2 Examples of compliance and non-compliance of this rule



- G108 Opponent's zone, no extension.** A ROBOT whose BUMPERS are intersecting the opponent's LOADING ZONE or COMMUNITY may not extend beyond its FRAME PERIMETER. Extensions which are both MOMENTARY and inconsequential are an exception to this rule.

Violation: FOUL or TECH FOUL if REPEATED.

Examples of MOMENTARY and inconsequential extensions include a wire or cable tie swinging out of the FRAME PERIMETER.

- G109 Don't extend in multiple directions.** ROBOTS may not extend beyond their FRAME PERIMETER in more than one direction (i.e. over 1 side of the ROBOT) at a time. The extension may not reach outside the projection of that side of the FRAME PERIMETER. For the purposes of this rule, a round or circular section of FRAME PERIMETER is considered to have an infinite number of sides. Exceptions to this rule are:

- A. MOMENTARY and inconsequential extensions in multiple directions,
- B. A ROBOT fully contained within its LOADING ZONE or COMMUNITY, and
- C. MOMENTARY movement of a MECHANISM from 1 FRAME PERIMETER side to an adjacent FRAME PERIMETER side.

Violation: FOUL. TECH FOUL if extending in multiple directions scores a GAME PIECE. If extending in multiple directions results in the ROBOT blocking all access to a FIELD ELEMENT, RED CARD

MOMENTARY and inconsequential actions include a wire or cable tie swinging out of the FRAME PERIMETER, including while an extension is deployed.

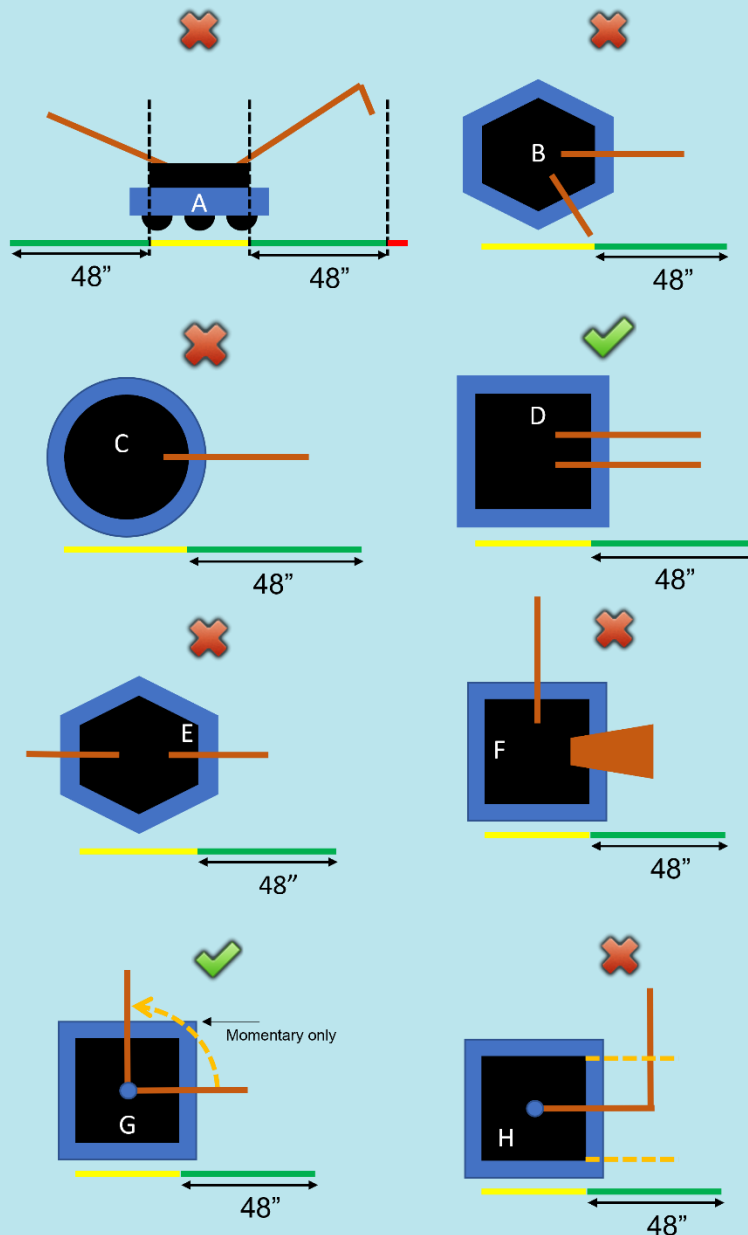
Examples of compliance and non-compliance of this rule are shown in Figure 7-3.

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 exceed the limit defined in this rule. Red bars represent a measured extension from the FRAME PERIMETER that exceeds the limit in this rule.

All following examples are legal in ROBOT'S LOADING ZONE and COMMUNITY.

- ROBOT A violates this rule for extending in more than one direction
- ROBOT B violates this rule for extending in more than one direction
- ROBOT C violates this rule for extending beyond an infinite number of sides and therefore any extension over an arc extends over multiple sides
- ROBOT D does not violate this rule
- ROBOT E violates this rule for extending in more than one direction
- ROBOT F violates this rule for extending in more than one direction
- ROBOT G does not violate this rule as long as the extension does not exceed the definition of MOMENTARY when positioned over the BUMPER corner.
- ROBOT H violates this rule for reaching outside the projection of the FRAME PERIMETER side.

Figure 7-3 Examples of compliance and non-compliance of this rule



7.2 ROBOT to ROBOT Interaction

- G201** ***Don't expect to gain by doing others harm.** Strategies clearly aimed at forcing the opponent ALLIANCE to violate a rule are not in the spirit of FIRST Robotics Competition and not allowed. Rule violations forced in this manner will not result in an assignment of a penalty to the targeted ALLIANCE.

Violation: FOUL. If REPEATED, TECH FOUL.

This rule does not apply for strategies consistent with standard gameplay, for example a red ALLIANCE ROBOT in their COMMUNITY in the final 30 seconds of the MATCH contacts a blue ALLIANCE ROBOT.

This rule requires an intentional act with limited or no opportunity for the team being acted on to avoid the penalty, such as:

- forcing the opposing ROBOT to have greater than MOMENTARY CONTROL of more than 1 GAME PIECE.
- a blue ALLIANCE ROBOT pushing a red ALLIANCE ROBOT from fully outside the blue LOADING ZONE into the blue LOADING ZONE

- G202** ***There's a 5-count on PINS.** ROBOTS may not PIN an opponent's ROBOT for more than 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 6 ft. (~183 cm) from each other, either ROBOT has moved 6 ft. from where the PIN initiated, or the PINNING ROBOT gets PINNED, whichever comes first. The PINNING ROBOT(S) must then wait for at least 3 seconds before attempting to PIN the same ROBOT again.

Violation: FOUL, plus an additional TECH FOUL for every 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.

If the PINNING ROBOT gets PINNED, the original PIN count terminates. Otherwise, if a ROBOT re-PINS the same ROBOT before the 3 seconds referenced in the last sentence of this rule, the REFEREE'S count resumes from the initial PIN (versus starting at 0).

- G203** ***Don't collude with your partners to shut down major parts of game play.** 2 or more ROBOTS that appear to a REFEREE to be working together may neither isolate nor close off any major element of MATCH play.

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

Examples of violations of this rule include, but are not limited to:

- shutting down access to all GAME PIECES,
- quarantining all opponents to a small area of the FIELD,
- blocking all access to the LOADING ZONE, and
- blocking all access to the COMMUNITY

A single ROBOT blocking access to a particular area of the FIELD is not a violation of this rule.

2 ROBOTS independently playing defense on 2 opponent ROBOTS is not a violation of this rule.

Note, [G204](#), [G205](#), and [G206](#) are mutually exclusive. A single ROBOT to ROBOT interaction which violates more than 1 of these rules results in the most punitive penalty, and only the most punitive penalty, being assessed.

G204 *Stay out of other ROBOTS. A ROBOT may not use a COMPONENT outside its FRAME PERIMETER (except its BUMPERS) to initiate contact with an opponent ROBOT inside the vertical projection of that opponent ROBOT'S FRAME PERIMETER. Contact with an opponent in an opening of their BUMPERS or in the space above the BUMPER opening are exceptions to this rule.

Violation: FOUL.

For the purposes of this rule, "initiate contact" requires movement towards an opponent ROBOT.

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

G205 *This isn't combat robotics. A ROBOT may not damage or functionally impair an opponent ROBOT in either of the following ways:

- A. deliberately, as perceived by a REFEREE.
- B. regardless of intent, by initiating contact inside the vertical projection of an opponent ROBOT'S FRAME PERIMETER. Contact between the ROBOT'S BUMPERS or COMPONENTS inside the ROBOT'S FRAME PERIMETER and COMPONENTS inside an opening of an opponent's BUMPERS is an exception to this rule.

Violation: TECH FOUL and YELLOW CARD. If opponent ROBOT is unable to drive, TECH FOUL and RED CARD

FIRST Robotics Competition can be a full-contact competition and may include rigorous game play. While this rule aims to limit severe damage to ROBOTS, teams should design their ROBOTS to be robust.

The exception in [G205-B](#) effectively means that ROBOTS with BUMPER gaps are at their own risk regarding damaging contact in these areas.

Examples of violations of this rule include, but are not limited to:

- a. A ROBOT leaves an arm extended, spins around to change course, and unintentionally hits and damages a COMPONENT inside the FRAME PERIMETER of a nearby opponent ROBOT.
- b. A ROBOT, in the process of trying to quickly reverse direction, tips up on a single pair of wheels, lands atop an opponent ROBOT, and damages a COMPONENT inside that opponent's FRAME PERIMETER.
- c. A ROBOT high-speed rams and/or REPEATEDLY smashes an opponent ROBOT and causes damage. The REFEREE infers that the ROBOT was deliberately trying to the damage the opponent's ROBOT.

Examples of functionally impairing another ROBOT include, but are not limited to:

- d. opening an opponent's relief valve such that the opponent's air pressure drops and
- e. powering off an opponent's ROBOT (this example also clearly results in a RED CARD because the ROBOT is no longer able to drive).

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

For the purposes of this rule, “initiating contact” requires movement towards an opponent ROBOT.

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

“Unable to drive” means that because of the incident, the DRIVER can no longer drive to a desired location in a reasonable time (generally). For example, if a ROBOT can only move in circles, or can only move extremely slowly, the ROBOT is considered unable to drive.

G206 *Don’t tip or entangle. A ROBOT may not deliberately, as perceived by a REFEREE, attach to, tip, or entangle with an opponent ROBOT.

Violation: TECH FOUL and YELLOW CARD. If CONTINUOUS or opponent ROBOT is unable to drive, TECH FOUL and RED CARD.

Examples of violations of this rule include, but are not limited to:

- a. using a wedge-like MECHANISM to tip over opponent ROBOTS,
- b. making BUMPER-to-BUMPER contact with an opponent ROBOT that is attempting to right itself after previously falling over and causing them to fall over again, and
- c. causing an opponent ROBOT to tip over by contacting the ROBOT after it starts to tip if, in the judgement of the REFEREE, that contact could have been avoided.

Tipping as an unintended consequence of normal ROBOT to ROBOT interaction, as perceived by the REFEREE, is not a violation of this rule.

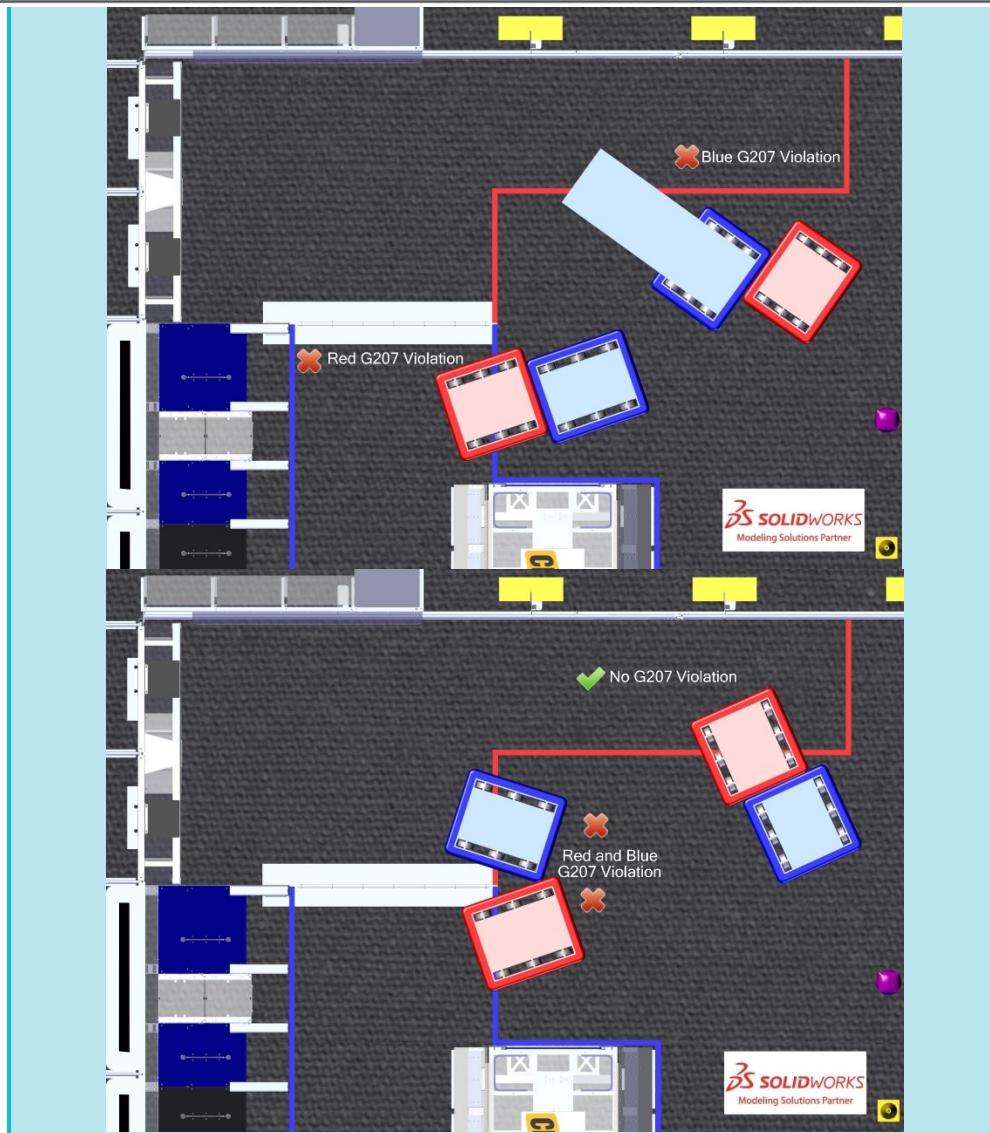
“Unable to drive” means that because of the incident, the DRIVER can no longer drive to a desired location in a reasonable time (generally). For example, if a ROBOT can only move in circles, or can only move extremely slowly, the ROBOT is considered unable to drive.

G207 Right of way. A ROBOT with any part of itself in their opponent’s LOADING ZONE or COMMUNITY may not contact an opponent ROBOT, regardless of who initiates contact.

Violation: FOUL per instance.

Teams should take note that they are putting themselves at great risk for FOULS if they choose to enter their opponent’s LOADING ZONE or COMMUNITY.

Figure 7-4: G207 Examples



G208 **Don't climb on each other unless in the COMMUNITY.** A ROBOT may not be fully supported by a partner ROBOT unless the partner's BUMPERS intersect its COMMUNITY.

Violation: TECH FOUL per instance.

G209 **During the ENDGAME, don't touch ROBOTS touching their CHARGE STATION.** During the ENDGAME, a ROBOT may not contact, either directly or transitively through a GAME PIECE, an opponent ROBOT contacting its CHARGE STATION or supported by a partner contacting its CHARGE STATION, regardless of who initiates contact. A ROBOT in contact with its CHARGE STATION and partially in its opponent's LOADING ZONE is not protected by this rule.

Violation: The contacted opponent ROBOT, and any ROBOTS contacting their CHARGE STATION when the violation occurred, and any partners it's supporting, will be considered DOCKED and ENGAGED.

7.3 FIELD Interaction

G301 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-D exclude GAME PIECES.

- A. grabbing,
- B. grasping,
- C. attaching to (including the use of a vacuum or hook fastener to anchor to the FIELD carpet and excluding use of the DRIVER 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 with,
- F. suspending from, and
- G. damaging.

Violation: MATCH won't start until the situation is corrected. If during a MATCH, TECH FOUL. If during a MATCH and REPEATED or longer than MOMENTARY, 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, popping, tearing off pieces, or routinely marking GAME PIECES are violations of this rule.

G302 Stay on your side before TELEOP. Before TELEOP, a ROBOT may not intersect the infinite vertical volume created by the CENTERLINE of the FIELD.

Violation: FOUL. If contact with an opponent ROBOT, TECH FOUL. If contact with opponent's CHARGE STATION, the opponent ALLIANCE will be considered to have a successfully DOCKED and ENGAGED ROBOT at the end of AUTO.

If an ALLIANCE uses a GAME PIECE to prevent motion of the CHARGE STATION, [G402](#) may also apply.

G303 Do not interfere with opponent GAME PIECES before TELEOP. Before TELEOP, a ROBOT action may not cause GAME PIECES staged on the opposing side of the FIELD to move from their starting locations.

Violation: TECH FOUL per moved GAME PIECE

G304 Don't mess with the opponent's CHARGE STATION. ROBOTS, either directly or transitively through a GAME PIECE, may not cause or prevent the movement of the opponent CHARGE STATION. The following are exceptions to this rule:

- A. movement, or prevention of movement, of an opponent CHARGE STATION because of a MOMENTARY ROBOT action resulting in minimal CHARGE STATION movement
- B. a ROBOT forced to contact an opponent's CHARGE STATION because of contact by an opponent ROBOT, either directly or transitively through a GAME PIECE or other ROBOT (e.g. a ROBOT wedged underneath the CHARGE STATION by the opposing ALLIANCE either intentionally or accidentally).

Violation: *FOUL per instance. During the ENDGAME, any ROBOTS contacting their CHARGE STATION when the violation occurred, and any partners it's supporting, will be considered DOCKED and ENGAGED*

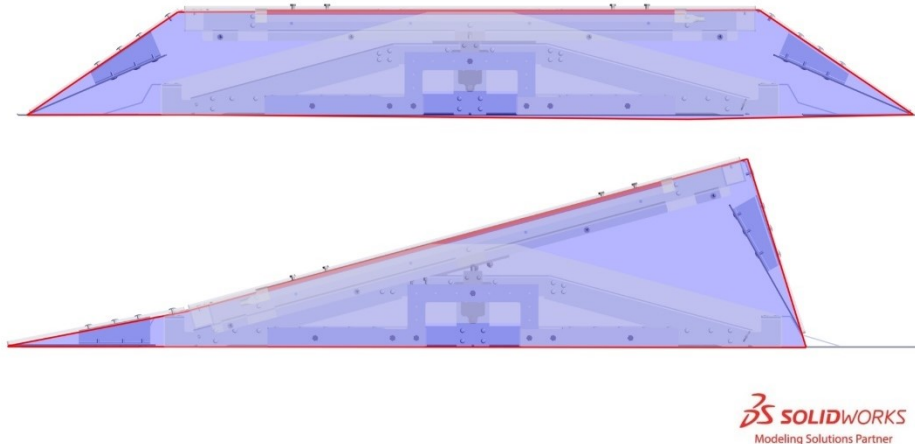
G305 Don't trick the sensors. Teams may not interfere with automated scoring hardware.

Violation: *RED CARD for the ALLIANCE*

G306 Don't jam the CHARGE STATION. A ROBOT may not place any part of itself inside the CHARGE STATION assembly (i.e. within the volume defined by its ramps and top surface, as shown in Figure 7-5) in an attempt to inhibit CHARGE STATION functionality.

Violation: *RED CARD*

Figure 7-5 The volume inside the CHARGE STATION



7.4 GAME PIECES

G401 *Keep GAME PIECES in bounds. ROBOTS may not intentionally eject GAME PIECES from the FIELD (either directly or by bouncing off a FIELD element or other ROBOT).

Violation: *FOUL per GAME PIECE.*

G402 *GAME PIECES: use as directed. ROBOTS may not deliberately use GAME PIECES in an attempt to ease or amplify challenges associated with FIELD elements.

Violation: *TECH FOUL per GAME PIECE.*

Examples include, but are not limited to:

- a. wedging a CUBE under the CHARGE STATION to ease ENGAGING and
- b. placing a CONE on the opponent's CHARGE STATION to make it harder to drive on.

G403 1 GAME PIECE at a time (except in LOADING ZONE and COMMUNITY). ROBOTS completely outside their LOADING ZONE or COMMUNITY may not have CONTROL of more than 1 GAME PIECE, either directly or transitively through other objects.

A ROBOT is in CONTROL of a GAME PIECE if:

- A. the GAME PIECE is fully supported by the ROBOT, or
- B. the ROBOT is intentionally moving a GAME PIECE to a desired location or in a preferred direction

Violation: FOUL per additional GAME PIECES. If egregious, YELLOW CARD.

Moving a GAME PIECE to access an area of the FIELD (e.g. the CHARGE STATION) is not considered intentionally moving to a desired location or in a preferred direction.

Egregious examples include but are not limited to the following:

- a. simultaneous CONTROL of 3 GAME PIECES
- b. CONTINUOUS CONTROL of 2 or more GAME PIECES
- c. frequent CONTROL of 2 or more GAME PIECES (an approximate count for frequent in this context is if this rule is violated more than 3 times in a MATCH)

- G404** **Launching GAME PIECES is only okay in the COMMUNITY.** A ROBOT may not launch GAME PIECES unless any part of the ROBOT is in its own COMMUNITY.

Violation: TECH FOUL per GAME PIECE. REPEATED violations of this rule are likely to escalate rapidly to YELLOW or RED CARDS.

A GAME PIECE is considered launched if it is shot into the air, kicked across the floor, or thrown in a forceful way.

This rule is not intended to penalize typical movement of GAME PIECES outside an ALLIANCE'S COMMUNITY which come to rest a short distance from the ROBOT. Examples of such actions could be but are not limited to,

- a. Running an intake in reverse causing a GAME PIECE to travel a short distance from the ROBOT
- b. A ROBOT pushing a GAME PIECE a short distance away in the process of herding it across the FIELD

- G405** **Don't mess with the opponents' GRIDS.** A ROBOT may not move a scored GAME PIECE from an opponent's NODE.

Violation: FOUL and opponents are awarded the SUSTAINABILITY BONUS Ranking Point.

