

Q1 Charging Station Poly-Carbonate Material

Q: What is the material and equivalent part numbers of the poly-carbonate used for the ramps and top of the charging station?

A: We're not sure we understand your question. Any **FIRST** recommended alternatives or substitutes are listed on the item's [drawing](<https://www.firstinspires.org/robotics/frc/playing-field>). Any additional substitute material is at the discretion of the team and a function of the team's needs and resources.

(Asked by **3489** answered Jan 11th 23)

Q2 Supply chain impact and the definition of a VENDOR

Q: Section 9 provides guidelines for a VENDOR as a legitimate source for COTS items. With the supply train constraints over the past few years, we've seen parts from many vendors have significant, prolonged (>1 year) availability constraints - either backordered for significant amounts of time, or out of stock for significant amounts of time. These issues appear to be at odds with part D of the definition. How should teams apply this definition to these vendors and parts?

A: Please see [Team Update 02] (<https://firstfrc.blob.core.windows.net/frc2023/Manual/TeamUpdates/TeamUpdate02.pdf>). If that doesn't answer your question, please rephrase and resubmit.

(Asked by **2177** answered Jan 13th 23)

Q3 R408 *BUMPER construction.

Q: R408 *BUMPER construction. states: BUMPERS must be constructed as follows (see Figure 9-7): A. be backed by $\frac{3}{4}$ in. thick (nominal, ~19mm) by 5 in. $\pm \frac{1}{2}$ in. (~127 mm \pm 12.7 mm) tall plywood, Oriented Strand Board (OSB) or solid wood (with the exception of balsa). It is not listed, but would we be allowed to use recycled plastic lumber?

A: !R408 lists the only materials permitted for use in backing BUMPERS; materials **not** listed in !R408 are not permitted for the use case.

(Asked by **9257** answered Jan 11th 23)

Q4 Discrepancy between MatchMaker software used by the field and 11.6.2

Q: There appears to be a discrepancy between the match scheduling software (MatchMaker 1.5) and the game manual. According to section 11.6.2, it is a higher priority of the schedule to “minimize the number of times a team plays opposite any team” than it is to “minimize the number of times a team is allied with any team”. According to analysis, the MatchMaker 1.5 scheduler scoring favors duplicate opponents over duplicate partners by a ratio of 5 to 1, which is contradictory to 11.6.2.

A: Please see [Team Update 02] (<https://firstfrc.blob.core.windows.net/frc2023/Manual/TeamUpdates/TeamUpdate02.pdf>). If that doesn't answer your question, please rephrase and resubmit.

(Asked by **2177** answered Jan 13th 23)

Q5 Extending beyond frame perimeter

Q: G109 states that robots may not extend in more than one direction beyond the frame perimeter, crossing over only one side of the robot. A robot deploys a T-shaped mechanism in front of the robot that then extends the top of the T longer (think G107 drawing D, with a long vertical line at the end of the extension), so that the ends are beyond the forward projection of the sides of the frame perimeter but within the boundary set by R105. Would this robot violate G109?

A: Please see [Team Update 02]

(<https://firstfrc.blob.core.windows.net/frc2023/Manual/TeamUpdates/TeamUpdate02.pdf>). If that doesn't answer your question, please rephrase and resubmit.

(Asked by **3487** answered Jan 13th 23)

Q6 Extension over a circular robot

Q: Per G109, robots can only extend over 1 side of the robot and a circular robot or frame section has an infinite number of sides. Does this effectively prohibit extension of any mechanism over a circular frame segment, or is there a minimum width for a mechanism that could be extended over that frame segment?

A: We believe Example C in the blue box under !G109 answers your question (it references a completely circular FRAME PERIMETER and also applies to a circular *part* of a FRAME PERIMETER). Note that exceptions A or B may apply which would allow this extension to not violate !G109.

(Asked by **2177** answered Jan 11th 23)

Q7 G301 Questions: Attaching to and suspending from

Q: Part 1: Under G301, what is the definition of suspending from? If a robot is only contacting the top of the charge station surface and/or another robot on their alliance BUT their wheels are also over the edge of the charge station and off the ground. Is this legal or would it be a violation of G301? Part 2: If my robot was to use a suction cup secured to the top surface of the charge station and released at the conclusion of the match without field damage, is this a violation of G301?

A: We cannot comment absolutely on hypothetical scenarios. The ultimate decision would be determined by the REFEREES at your event, with the final call made by the Head REFEREE. That being said, there is no *FIRST* specific definition of "suspending from." In the absence of a definition specific to CHARGED UP, a common definition from a reputable source, like Merriam Webster's website, can apply: "to hang so as to be free on all sides except at the point of support." A ROBOT with its center of gravity above the surface of the CHARGE STATION, but with a part of it below the CHARGE STATION surface is unlikely to be assessed as "suspending from." !G301 prohibits a ROBOT from attaching to FIELD elements, regardless of if damage occurs (and the parenthetical specifically refers to vacuum as a method for attaching).

(Asked by **67** answered Jan 12th 23)

Q8 Clarification of R203 and "high intensity light sources" with vision tape placement

Q: The placement of the vision tape on the poles near the driver station means teams will be inadvertently blinded by their own alliances vision lights. There are fixes for this, but ultimately if someone's light does shine on a driver, they can invoke R203 and possibly have the offending device removed after reinspection. If the vision targets are between the driver and the robot the light will always hit the drivers. Is there a hard Lumen limit inspection can follow? How can we know ahead of time

A: We cannot comment on part/design legality or the legality of its hypothetical use. There is no lumen limit. If an LRI or Head Referee has concern about the intensity or use of a light source, it will be addressed at the event.

(Asked by **453** answered Jan 11th 23)

Q9 G403 Question: Definition of Completely Outside

Q: G403 states that "ROBOTS completely outside their LOADING ZONE or COMMUNITY" may not control more than one game piece at a time. What qualifies a robot as "completely outside" of these key zones? Is the robot considered completely outside of the zones if the robot's bumpers are completely outside of both zones? Alternatively, for the purposes of G403, could a robot still be considered inside the loading zone/community if any part of the robot extends over the tape line defining the zone's edge?

A: "Completely outside" can be interpreted literally. If any part of the ROBOT is in its LOADING ZONE or COMMUNITY, !G403 does not apply. The Glossary definition of a ROBOT includes its BUMPERS and any extensions.

(Asked by **2399** answered Jan 13th 23)

Q10 G301 Question : Grid Station

Q: We do not see anything restricting crossing the blue tape and driving into the grid to reduce the distance of extension outside of the frame. Provided we are able to straddle the 5" grid support legs and stop short of the ramp / April tag surface

A: There are no rules specifically prohibiting a ROBOT (or its drivetrain) from crossing the tape line at the front of the GRID.

(Asked by **6344** answered Jan 11th 23)

Q11 G301 and Arena Defenition

Q: G301 Restricts interaction with Game Pieces and Arena elements. The definition of arena is "a space which includes all elements of the game infrastructure that are required to play CHARGED UP: the FIELD, GAME PIECES, and all equipment needed for FIELD control, ROBOT control, and scorekeeping." Does this include the Charge Station and Grids?

A: Yes. The CHARGE STATION is a component of the FIELD which is a component of the ARENA.

(Asked by **991** answered Jan 11th 23)

Q12 11.8.1.6 District teams earning championship slots at regionals

Q: In 2022, post season, it was announced that district teams could no longer earn championship slots at regional events. 11.8.1.6 does not say they can't, but alludes that if they do, it counts against their district total.

Why say that at all? It was worrying to read. Curious if there is a typo or reasoning.

A: Please see [Team Update 02]

(<https://firstfrc.blob.core.windows.net/frc2023/Manual/TeamUpdates/TeamUpdate02.pdf>). If that doesn't answer your question, please rephrase and resubmit.

(Asked by **4272** answered Jan 13th 23)

Q13 Do game pieces, scored in AUTO, receive both the AUTO points and Tele-op points?

Q: After the game reveal, some teammates and I were playing the new xRC simulator update. However we quickly noticed that the scoring in the game was off. After some testing it turned out that the game awarded points to game pieces scored in AUTO twice.(Both the AUTO and Tele-op points) This left us and the team wondering whether that is actually what happens in competition. In the manual we couldn't find a clear answer, so: Do game pieces scored in AUTO get both the AUTO points and Tele-op points?

A: No, GAME PIECES scored in AUTO do not get counted for both AUTO and TELEOP points. GAME PIECES are scored per Table 6-2 based on when they were scored. Also note the details at the end of [Section 6.4]

(https://firstfrc.blob.core.windows.net/frc2023/Manual/HTML/2023FRCGameManual.htm#_Toc124258655) for what happens with GAME PIECES scored in AUTO that are later removed.

(Asked by **4481** answered Jan 11th 23)

Q14 Can both robots interacting in G207 gain the foul?

Q: If a robot is partially within its loading zone and touches another robot partially within its loading zone are both robots awarded a foul

A: We cannot comment absolutely on hypothetical scenarios. The ultimate decision would be determined by the REFEREES at your event, with the final call made by the Head REFEREE. However, per the second image in !G207's blue box, it is possible for both ROBOTS in an interaction to be awarded !G207 FOULS. As a reminder, a !G207 violation occurs when a ROBOT in the opponent's zone contacts an opponent ROBOT, regardless of where the opponent is located.

(Asked by **3683** answered Jan 11th 23)

Q15 Inspection Checklist broken link.

Q: The link in Section 10 Blue box "An Inspection Checklist is available...." appears to be broken.

A: Please see [Team Update 02]

(<https://firstfrc.blob.core.windows.net/frc2023/Manual/TeamUpdates/TeamUpdate02.pdf>). If that doesn't answer your question, please rephrase and resubmit.

(Asked by **3461** answered Jan 13th 23)

Q16 Game Pieces and a robot's parameter G107

Q: In rule G107 it states "ROBOTS may not extend beyond their FRAME PERIMETER in more than 48 in. (~122 cm)", if the robot is within 48" of its frame and a game piece extends beyond the parameter, is that allowed?

A: !G107 applies to the ROBOT and not to GAME PIECES with which it's interacting.

(Asked by **3242** answered Jan 12th 23)

Q18 extention below robot

Q: would an extension below the robot raise the bumper to be outside the bumper zone breaking r402?

A: We cannot rule absolutely on hypothetical ROBOT designs, and the final decision as to legality of a particular ROBOT lies with the Lead ROBOT Inspector (LRI) at each event. Per !R402, BUMPERS must be located entirely within the BUMPER ZONE. As noted in !R402's Blue Box example 2, deploying a MECHANISM which lifts the BUMPERS outside of the BUMPER ZONE is a violation of the rule.

(Asked by **4944** answered Jan 12th 23)

Q19 community access and G203

Q: G203 says not to shut down major parts of the field, e.g. by "blocking all access to the community." The community has three paths to access it: two easy ones on the floor, and one hard path, "up and over" the charging station. If two robots block access to the two easy paths, does that count as "shutting down" the community, even though the "up and over" charging station path is still available?

A: The use of the term "all" in the Blue Box example D can be read literally and is not limited to ROBOT capabilities.

(Asked by **100** answered Jan 12th 23)

Q20 G201 and Defensive Robots Near Loading Zones

Q: In the blue box for G201, one example of a prohibited action is pushing a robot from completely outside the opponent's loading zone into that loading zone in order to draw a G207 foul. If a blue robot, just outside of the red loading zone, was actively defending a red robot from accessing that zone, if the red robot, while trying to move past the blue robot, pushes the blue robot into the loading zone, what criteria will referees use to determine whether to call a G201 or G207 foul?

A: We cannot comment absolutely on hypothetical scenarios. The ultimate decision would be determined by the REFEREES at your event, with the final call made by the Head REFEREE. Depending on the larger context, the REFEREE may perceive that a ROBOT action is intended to draw a FOUL and in violation of !G201. Alternatively, the context may imply to the REFEREE that the ROBOT was attempting standard game play and not in violation of !G201.

(Asked by **2830** answered Jan 12th 23)

Q21 G301 and Alignment Devices for Cone Nodes

Q: If a team is using a concave device to passively align a robot mechanism to a cone node, what criteria will referees use to determine if this alignment device is violating G301 by grabbing or grasping the cone node?

A: We cannot rule absolutely on hypothetical ROBOT designs, and the final decision as to legality of a particular ROBOT lies with the Lead ROBOT Inspector (LRI) at each event. The final decision as to the legality of the use of a ROBOT element lies with the Head REFEREE. Generally, use of an alignment device is not considered a violation of !G301, however a snug, encompassing, or otherwise grippy alignment device is likely considered to have grabbed or grasped a FIELD element.

(Asked by **2830** answered Jan 12th 23)

Q22 LED Lighting

Q: After looking through the game manual we have not found any rules against the use of LED lights on the robot and wanted to verify that we could put LED strips (Green/White) as a means of decoration.

A: There are no rules explicitly disallowing LED lights on the ROBOT. Please ensure all other applicable ROBOT rules (like proper wiring and safety) are followed.

(Asked by **7454** answered Jan 12th 23)

Q23 G108 & G109 and Momentary, Inconsequential Incursions into/out of a Zone

Q: In G108 and G109, exceptions are laid out for momentary and inconsequential robot extensions. However an exception is never mentioned for momentary and inconsequential incursions into or out of the areas relevant to these rules. Therefore, would a robot with a consequential extension outside their frame perimeter that makes a momentary and inconsequential incursion into the opposing loading zone be penalized under G108?

A: We cannot comment absolutely on hypothetical scenarios. The ultimate decision would be determined by the REFEREES at your event, with the final call made by the Head REFEREE. However, per !G108, the ROBOT'S BUMPERS must be intersecting the opponent's LOADING ZONE or COMMUNITY to apply. If a ROBOT'S extension intersects the opponent's LOADING ZONE or COMMUNITY while the ROBOT'S BUMPERS do not, !G108 does not apply.

(Asked by **2830** answered Jan 12th 23)

Q24 G104 Definition of an Exposed Corner

Q: If a robot's bumper fails such that on one side of a corner, the frame is exposed in the 6 inches that are supposed to be covered by the bumper up to the corner of the frame, but the adjoining side of the frame is correctly covered by a bumper segment up to that corner, would this robot be disabled under G104?

A: We cannot comment absolutely on hypothetical scenarios. The ultimate decision would be determined by the REFEREES at your event, with the final call made by the Head REFEREE. If a segment detaches or a corner is not protected (from !R401, adequately protected requires "at least 6 in. (~16 cm) of BUMPER must be placed on *each side* of each outside corner (see Figure 9-3) and must extend to within ¼ in. (~6 mm) of the FRAME PERIMETER corner."), the ROBOT is likely to be disabled per !G104.

(Asked by **2830** answered Jan 12th 23)

Q25 CHARGE STATION Scoring - AUTO and ENDGAME

Q: 6.4 and 6.4.2 address scoring in the CHARGE STATION. While specific mention is given to GRID scoring during AUTO and TELEOP (removal of a scored piece) there is no clarification for CHARGE STATION scoring. Given the language in 6.4.2 refers to "A ROBOT" can the same ROBOT earn CHARGE STATION points in AUTO and additional points at the end of TELEOP?

A: Yes.

(Asked by **5881** answered Jan 12th 23)

Q26 Can Link be awarded during Autonomous Mode

Q: Can Link be awarded during Autonomous Mode

A: Yes.

(Asked by **4546** answered Jan 12th 23)

Q27 Circular Robot with constantly moving extension

Q: If a robot has a circular style perimeter it is considered as an infinite number of sides You are allowed to change sides so long as you only have momentary time in 2 or more sides If a circular perimeter robot has an extension that is constantly moving or only stops momentarily can they have an extension that complies with the rule of only extending on one side

A: We cannot rule absolutely on hypothetical ROBOT designs, and the final decision as to legality of a particular ROBOT lies with the Lead ROBOT Inspector (LRI) at each event. Generally, if a ROBOT extends over a round part of it's FRAME PERIMETER, it is extending over multiple sides continuously (i.e. longer than MOMENTARY), even if the extension is in motion.

(Asked by **694** answered Jan 12th 23)

Q28 activation bonus

Q: ACTIVATION BONUS is At least 26 total CHARGE STATION points earned in AUTO and/or ENDGAME. Does this mean only charge station points in auto and only those points in end game? Or is it a combination of both? Does parking contribute to this total because it is an ENDGAME activity?

A: The ACTIVATION BONUS is earned based on the combined CHARGE STATION points from AUTO and ENDGAME. No, PARKING does not contribute to the ACTIVATION BONUS.

(Asked by **694** answered Jan 12th 23)

Q29 Painted parts from before kickoff

Q: Say we have an item which was COTS which we then painted or powder-coated prior to kickoff, making it a FABRICATED ITEM (specifically thinking of coloring aluminum tubing to be a color other than silver-grey). R302-E permits functional equivalents of COTS items and sub-bullet (a) permits non-functional decoration. Would such items be allowed under R302-E?

A: Yes.

(Asked by **857** answered Jan 12th 23)

Q30 G405 Collusion to Gain Mutual Ranking Points

Q: H105 and H107 establish that throwing a match is defined by losing ranking points and that you cannot convince an opposing alliance to lose ranking points. G405 states if an alliance moves game pieces in the opposing alliance's nodes, it is a foul and the opposing alliance will be awarded the sustainability bonus ranking point. Would alliances be able to negotiate so both alliances commit a G405 violation on purpose and thus both are awarded a ranking point?

A: Please see [Team Update 03]

(<https://firstfrc.blob.core.windows.net/frc2023/Manual/TeamUpdates/TeamUpdate03.pdf>). If that doesn't answer your question, please rephrase and resubmit.

(Asked by **1712** answered Jan 17th 23)

Q31 Extending in multiple directions to score within COMMUNITY

Q: G109 has two exceptions which allow extending beyond the FRAME PERIMETER in multiple directions, one of which is "A ROBOT fully contained within its LOADING ZONE or COMMUNITY". However, G109 also states that it is a TECH FOUL if extending in multiple directions scores a GAME PIECE. Is it still a TECH FOUL if the ROBOT scoring the GAME PIECE is fully-contained within its COMMUNITY?

A: No, any ROBOT fully contained within their COMMUNITY is an exception to !G109, and so no part of the violation applies.

(Asked by **695** answered Jan 12th 23)

Q32 Can robot drive into HYBRID NODE area

Q: Can robot drive into HYBRID NODE area? The area is Bottom ROW for CONE and CUBE.

A: There are no rules preventing ROBOTS from driving into the HYBRID NODE provided !G301 is not being violated

(Asked by **7522** answered Jan 12th 23)

Q33 6.1.1 Game Pieces - Section B - Game Pieces on Staging Marks

Q: When placing the game pieces on the staging mark does the orientation of the game pieces matter, as long as they are on the staging marks? Specifically, can a cone or cube be orientated to be laying down or angled non perpendicular to the field?

A: The orientation is not specified, provided the GAME PIECE is on its staging mark. Please see [Team Update 02](<https://firstfrc.blob.core.windows.net/frc2023/Manual/TeamUpdates/TeamUpdate02.pdf>) for more information on staging GAME PIECES. If that doesn't answer your question, please rephrase and resubmit.

(Asked by **7769** answered Jan 13th 23)

Q34 R605 Batteries are not ballast

Q: In R605 It states that additional battery's can not be used for weight. Are we still able to use the single battery allowed by R601 and R602 as a ballast? More specifically can we move our battery inside our chassis?

A: We cannot rule absolutely on hypothetical ROBOT designs, and the final decision as to legality of a particular ROBOT lies with the Lead ROBOT Inspector (LRI) at each event. However while there is no restriction on where the single battery is placed in the robot, teams should also be aware of !G101, !R606, !R612, and !R613 while designing their robot.

(Asked by 7657 answered Jan 12th 23)

Q35 R101: Frame Perimeter must be fixed

Q: Rule R104 states that a "ROBOT'S STARTING CONFIGURATION may not have a FRAME PERIMETER greater than 120 in. (~304 cm)..." Rule R101 states that a robot: "must have a FRAME PERIMETER, contained within the BUMPER ZONE and established while in the ROBOT'S STARTING CONFIGURATION, that is comprised of fixed, non-articulated structural elements of the ROBOT." Does Rule R101, requiring fixed structural elements, prevent a robot from expanding or contracting once the match has begun?

A: A ROBOT may expand (e.g. via an arm that extends out over its BUMPERS), but !R101 states that its FRAME PERIMETER structure may neither expand nor contract, it must be a rigid, static frame.

(Asked by 5410 answered Jan 12th 23)

Q36 Is using vacuum to hang onto charging station legal?

Q: In Q7, it is not clear if the answer to whether using vacuum to hang onto the charging station is legal.

A: !G301 prohibits a ROBOT from attaching to FIELD elements, and the parenthetical specifically refers to vacuum as a method for attaching.

(Asked by 5990 answered Jan 12th 23)

Q37 G301 Question, question from GDC response on Q7

Q: On Q/A Q7, GDC Admin said: A ROBOT with its center of gravity above the surface of the CHARGE STATION, but with a part of it below the CHARGE STATION surface is unlikely to be assessed as "suspending from." Question from that response: "When you said 'above', in response to question Q7, which view of the Charge Station is used to gauge (e.g. side view, top view, both, etc.) 'Above'?"

A: "Above" in this sentence is relative to distance from the floor. Thus, to gauge "above" the CHARGE STATION, one would use the side view.

(Asked by 67 answered Jan 13th 23)

Q38 H303 Mimicry

Q: May a team bring a passive visual target and display it through the driver station window, as allowed in H303B, that are similar to the AprilTags used on the field, but different in obvious ways, for example, a different

AprilTag family, or a two-foot square instead of 6 inches, or a round tag like WhyCon or CCTag. How similar would such a passive target need to be to be considered "mimicry"?

A: In order to be considered mimicry an image would need to be reasonably likely to be falsely detected as a FIELD target. AprilTags of other families, or other tag systems, are unlikely to be falsely detected as a target. An AprilTag identical to a FIELD target, but at a different size would be considered mimicry. AprilTags of the same family (16h5) with IDs not used on the field would also be considered mimicry as they may be detected by a system which chooses to naively align with any target presented.

(Asked by **100** answered Jan 12th 23)

Q39 Non-lifting extension below the robot

Q: Hi FRC Staff, expanding on Q18. If a robot has a component that extends below the normal lowest point on the robot but is not able to lift the robot is this an R402 violation? This extension could be flexible/foldable/moveable/etc. "If the robot were placed on a flat surface, the flexible material would bend and the lowest point of the robot would be less than 7.5 inches below the top of the robot's bumpers." {FRC#3504 - Q4-2018}. ----- Thank you and have a fantastic day. - Spectrum

A: Hi Spectrum! We cannot rule absolutely on hypothetical ROBOT designs, and the final decision as to legality of a particular ROBOT lies with the Lead ROBOT Inspector (LRI) at each event. Generally, if the MECHANISM or COMPONENT that extends below the "normal lowest point of the ROBOT" does not lift the ROBOT enough to move the BUMPERS out of the BUMPER ZONE, it is not a violation of !R402.

(Asked by **3847** answered Jan 12th 23)

Q40 Are drones allowed?

Q: Are we allowed to use a drone, as long as we tether it, and use allowed motors, etc.

A: We cannot rule absolutely on hypothetical ROBOT designs, and the final decision as to legality of a particular ROBOT lies with the Lead ROBOT Inspector (LRI) at each event. Additionally, please review Section 1.10 for information and guidance about productive questions in the Q&A. Specifically, it details "some examples of questions that will not be answered in the Q&A are: Is this part/design legal?" The purpose of the Q&A is to help clarify rules, not pre-condone a particular design, implementation, etc. While there is no explicit prohibition of drones, several rules (including but not limited to !G101, !G102, !R105, !R202, !R203, !R206, !R501, !R601, !R602, !R702, !R707) are relevant in consider such a solution. If any of these or other rules are unclear, please resubmit.

(Asked by **5145** answered Jan 13th 23)

Q41 Robots in the Hybrid Node

Q: Is there any penalty for robots crossing the tape in front of the hybrid node? Thanks from team 1296!

A: Please see !Q32. If this does not answer your question please rephrase and resubmit.

(Asked by **1296** answered Jan 13th 23)

Q42 Follow-up to Q7 regarding the definition of “suspending from” (G301-F)

Q: Regarding G301-F, the definition used to assess whether or not a ROBOT is “suspending from” the ARENA can have a material impact on a ROBOT’s legality, so receiving a definitive response to the following prior to when a ROBOT competes in a MATCH would be appreciated: If a ROBOT’s center of gravity is horizontally to the side of and lower than, but not directly underneath, the volume encompassing all points of contact between the ROBOT and ARENA, is the robot “suspending from” the ARENA? Thanks!

A: We still cannot comment absolutely on hypothetical scenarios. The ultimate decision is made by the REFEREES at your event, with the final call made by the Head REFEREE. Generally, a ROBOT supporting itself from the surface of the CHARGE STATION such that its center of gravity is lower than that surface is likely to be perceived as suspending or hanging from the CHARGE STATION surface. There may be circumstances where that's not the case.

(Asked by **1619** answered Jan 13th 23)

Q43 Clarify R402 phrase "changing the ROBOT configuration" WRT flexible component or mechanism

Q: R402 blue box states "This measurement is intended to be made as if the ROBOT is resting on a flat floor (without changing the ROBOT configuration)..." If a ROBOT has a flexible COMPONENT that is capable of extending below the normal lowest point of the ROBOT when the ROBOT is elevated (e.g., on top of the CHARGE STATION), but the COMPONENT passively flexes/moves back above the normal lowest point of the ROBOT when resting on a flat floor, is this considered a change of the ROBOT configuration?

A: We cannot rule absolutely on hypothetical ROBOT designs, and the final decision as to legality of a particular ROBOT lies with the Lead ROBOT Inspector (LRI) at each event. However, having a COMPONENT that passively moves is not a change to the ROBOT configuration.

(Asked by **4188** answered Jan 17th 23)

Q45 Servo Power

Q: Is it permissible to power multiple servos using the Rev Servo Power Module such that they have a common power and ground wire from a single port of the power module, but separate signal wires plugged into separate ports?

A: There are no rules that prohibit this.

(Asked by **5687** answered Jan 17th 23)

Q46 Delay between AUTO and TELEOP Periods

Q: Could you elaborate more on how the transition between the Autonomous and the TeleOperated period will work? 1) During the 3 second delay, what is the status of the robot? Will it be Disabled, Enabled in Auto mode, or Enabled in TeleOp Mode? 2) When may Drive Teams step forward and take control of their robots? At the end of the Auto period, or at the start of the TeleOp period? Will there be a coordinated instruction from the Emcee similar to FTC? ("Drivers Pick Up Your Controllers. 3 2 1 Go!")

A: 1) ROBOTS are disabled during the transition from AUTO to TELEOP. 2) AUTO ends when the timer reaches 0. At that point, AUTO rules no longer apply, and DRIVE TEAMS may step forward. 3) There will not be a coordinated count down to the start of TELEOP. The FMS will enable ROBOTS 3 seconds after the end of AUTO. As a courtesy to participants FMS provides audio cues that indicate the end of AUTO (Buzzer), and the

start of TELEOP after the 3 second delay (3 Bells). Please also note that audio cues are not intended as official MATCH markers. If there is a discrepancy between an audio cue and the FIELD timers, the FIELD timers are the authority.

(Asked by **6352** answered Jan 13th 23)

Q49 Four OR Less Game Pieces?

Q: As stated in 6.1.1. Section B "each ALLIANCE may stage 4 GAME PIECES of their choice 1 per any of the STAGING MARKS between their COMMUNITY and the CENTER LINE such that each GAME PIECE covers or surrounds the center of its STAGING MARK" and goes on in Section B subsection A, "If no team decision CUBES will be placed on the 2 outer and CONES will be placed on the 2 inner" Would an alliance be able to select to stage less than 4 game pieces and leave STAGING MARKS without a GAME PIECES?

A: *Edited Jan 20, 2023 per [Team Update 04]

(<https://firstfrc.blob.core.windows.net/frc2023/Manual/TeamUpdates/TeamUpdate04.pdf>). * The MATCH will only start if there is a GAME PIECE covering or surrounding the center of each STAGING MARK. If an ALLIANCE does not place a GAME PIECE on a STAGING MARK, the appropriate GAME PIECE will be placed on that STAGING MARK as detailed in Section 6.1.1.

(Asked by **4786** answered Jan 15th 23)

Q50 MOMENTARY, Inconsequential extension beyond the frame perimeter

Q: G109 states that robots can't extend beyond 48 inches from the frame perimeter, an exception to this rule are MOMENTARY and Inconsequential extensions. A robot has a rotating arm with an intake at the end, the robot extends 1.5 inches beyond the 48 inch limit for a fraction of a second, while rotating thus mechanism, but it then stays within the 48 inch limit. Would this robot violate G109?

A: We cannot comment absolutely on hypothetical scenarios. The ultimate decision would be determined by the REFEREES at your event, with the final call made by the Head REFEREE. A ROBOT purposefully extending part of itself outside the boundaries in !G109 is likely consequential and thus is a violation of the rule.

(Asked by **9280** answered Jan 15th 23)

Q51 G301: Blocking charging station

Q: G301 states that robots may not grab, grasp or entangle with game elements. A robot deploys a system that enters the non protected side area of the CHARGING STATION, to prevent it from tipping to either side, the system is easily removed at the end of the match and does not damage the field. Is this system a violation to G301?

A: Edited Jan 17, 2023 per [Team Update 03]

(<https://firstfrc.blob.core.windows.net/frc2023/Manual/TeamUpdates/TeamUpdate03.pdf>). While potentially not a violation of !G301, we invite you to review !G105, !G207, !G304, and !G306 as added in [Team Update 03] (<https://firstfrc.blob.core.windows.net/frc2023/Manual/TeamUpdates/TeamUpdate03.pdf>).

(Asked by **9280** answered Jan 15th 23)

Q52 Extension bellow robot

Q: R402 states that if A ROBOT deploys a MECHANISM which lifts the BUMPERS outside the BUMPER ZONE (when virtually transposed onto a flat floor), that robot is violating the rule. A Robot is on top of the CHARGING STATION and deploys a mechanism that reaches the floor without lifting the bumpers (relative to the CHARGING STATION). Is this a violation to R402?

A: We cannot rule absolutely on hypothetical ROBOT designs, and the final decision as to legality of a particular ROBOT lies with the Lead ROBOT Inspector (LRI) at each event. Generally, if a MECHANISM'S deployment causes the ROBOT'S BUMPERS to be outside the BUMPER ZONE when the ROBOT is removed from the CHARGE STATION and placed on a flat floor, !R402 is violated.

(Asked by **9280** answered Jan 15th 23)

Q53 FRAME PERIMETER projection clarification

Q: Team Update 02 revises G109 such that "The extension may not reach outside the projection of that side of the FRAME PERIMETER." No definition of "that side" is given, nor is there a clear definition of the direction of the projection beyond ROBOT H added to the blue box showing a violation of this revision. How would the projection be defined for a ROBOT shaped like B or E? How about a Triangular shaped ROBOT?

A: The projection is conceptualized as if that side of the FRAME PERIMETER were to be translated straight out from the ROBOT, like a drawer.

(Asked by **5881** answered Jan 15th 23)

Q54 Charge station and inter-alliance robot interaction clarification.

Q: If a ROBOT is supported only by an alliance partner (who is fully on top of the CHARGE STATION) and contact with the top surface of the CHARGE STATION, but has its CG below the top surface of the CHARGE STATION, would that ROBOT be considered suspended from an ARENA element?

A: No.

(Asked by **2910** answered Jan 16th 23)

Q55 Will two robots on a level CHARGING STATION get more points than one robot?

Q: At the end of AUTO, if two robots are DOCKED on a LEVEL CHARGING STATION, will one robot receive the DOCKED and ENGAGED points (12 points), and the other receive DOCKED and not ENGAGED points (8 points) resulting in 20 total CHARGING STATION points in AUTO? Or will this result in only one robot receiving the DOCKED and ENGAGED points, resulting in 12 total CHARGING STATION points in AUTO?

A: If both ROBOTS are DOCKED and ENGAGED, the limit of 1 ROBOT in AUTO does not "demote" the other ROBOT to being DOCKED and not ENGAGED. The ALLIANCE earns 12 points for 1 DOCKED and ENGAGED ROBOT.

(Asked by **4068** answered Jan 15th 23)

Q56 Are HUMAN PLAYERS allowed to pick up the GAME PIECE Holders after the start of a MATCH?

Q: After the start of a MATCH, are HUMAN PLAYERS allowed to pick up the tray containing the GAME PIECES and place it anywhere inside the SUBSTATION AREA? If so, are they allowed to pick up the tray during the AUTO period, given that they remain behind the STARTING LINE in their area?

A: There are no rules that prohibit a HUMAN PLAYER from engaging with GAME PIECES and/or the tray during AUTO.

(Asked by **1468** answered Jan 15th 23)

Q57 Is pushing a GAME PIECE on the carpet from LOADING ZONE to COMMUNITY allowed by G404?

Q: G404 states that a ROBOT may move a GAME PIECE across the FIELD, given that the GAME PIECE comes to "rest a short distance from the ROBOT." This rule also explicitly allows a ROBOT to push a GAME PIECE "a short distance away in the process of herding it across the FIELD." If a ROBOT were to push a GAME PIECE from the LOADING ZONE to the COMMUNITY in one continuous motion, is this considered a violation since the GAME PIECE does not "come to rest" AND has been moved more than a "short distance?"

A: We cannot comment absolutely on hypothetical scenarios. The ultimate decision would be determined by the REFEREES at your event, with the final call made by the Head REFEREE. This is likely not considered "launching" per !G404. This would likely be considered a CONTROL of the GAME PIECE per !G403-B as the ROBOT is "intentionally moving a GAME PIECE to a desired location or in a preferred direction

(Asked by **1468** answered Jan 15th 23)

Q58 Clarification of point values of GAME PIECES de-scored and re-scored during TELEOP

Q: In Section 6.4, it states "If a GAME PIECE scored in AUTO gets removed from its NODE during TELEOP, the AUTO points are removed. If a GAME PIECE is scored in that NODE again, the AUTO points associated with the original scored GAME PIECE are restored. In this scenario: 1. Does that GAME PIECE receive additional TELEOP points or exclusively AUTO points? 2. Does the GAME PIECE have to be re-scored on the same NODE it was removed from or can it be any NODE in the same ROW to receive AUTO points?"

A: 1) Exclusively AUTO points. 2) The same NODE must have a GAME PIECE on it. It doesn't have to be the exact same GAME PIECE. (In other words, the scoring is relative to the specific NODE, not the specific GAME PIECE.)

(Asked by **1468** answered Jan 15th 23)

Q59 FRP material

Q: In the instructions for building a charging station, the ramps slide on ".09" Fiberglass Reinforced Plastic (FRP)". Does this refer to material such as the commonly-available Glasteel Glasliner, or to something else?

A: Yes, the material specified in that drawing is material such as Glasliner 0.090 FRP wall board.

(Asked by **100** answered Jan 16th 23)

Q60 Definition of DOCKED is slightly ambiguous - does my robot NEED to be fully supported?

Q: In 6.4.2, the wording of the definition of "DOCKED" is slightly lexically ambiguous: "A ROBOT is DOCKED if it is contacting only the CHARGE STATION and/or other items also directly or transitively fully supported by the CHARGE STATION." Does that mean a robot may be on the ground so long as it is in contact with a robot fully supported by the charging station? (i.e. following the "or" in the statement without the "and" as and/or sometimes means is possible).

A: We sincerely apologize for the ambiguity of our lexicon. The ground is not supported by the CHARGE STATION, so a ROBOT in contact with the ground is not considered DOCKED.

(Asked by **488** answered Jan 16th 23)

Q61 Pneumatic fittings

Q: Are fittings other than push fittings legal for pneumatics? Such the example below
https://www.amazon.com/dp/B085KXJ8XL/ref=syn_sd_onsite_desktop_44?ie=UTF8&psc=1&pd_rd_plhdr=t

A: There are no rules requiring push-to-connect fittings, provided all other ROBOT rules are satisfied.

(Asked by **6831** answered Jan 16th 23)

Q62 Human Player Substation Interaction

Q: According H505 the human player can have a body part inside the single substation for less than momentary time. If the human player is holding a game piece and that game piece extends outside of the substation and into the field while being held, is it considered an extension of the human player body and therefore a violation of H103 and/or H104?

A: The GAME PIECE is not considered an extension of the human body.

(Asked by **7769** answered Jan 16th 23)

Q63 Qualification Ranking AUTO Points: LINKS

Q: I know that LINKS can be scored in AUTO as referenced in Q26. The game manual lists a link as five points in the TELEOP column. In looking at the qualification ranking criteria (table 11-2), it says that average ALLIANCE AUTO points play a part in ranking teams. I was wondering if LINKS scored in AUTO are included in the AUTO points referenced in table 11-2, or if links are simply scored in AUTO, but do not count as "AUTO points."?

A: While LINKS can be created in AUTO, the points associated with them are determined in TELEOP (per table 6-2) and as such would not be applied to the average ALLIANCE AUTO score.

(Asked by **5347** answered Jan 16th 23)

Q64 COOPERTITION BONUS permanence

Q: Can a COOPERTITION BONUS be taken away if it is already earned? For example, if both ALLIANCES score 3 pieces on their CO-OP GRID they are awarded the COOPERTITION BONUS and the threshold for the SUSTAINABILITY BONUS thus is reduced to four LINKS. If the arrangement of GAME PIECES changes so that an ALLIANCE no longer has 3 GAME PIECES in its CO-OP GRID, is the criteria for a COOPERTITION BONUS no longer met. If so, would the threshold go back up to five LINKS?

A: If GAME PIECES are re-arranged such that there are no longer 3 GAME PIECES in the CO-OP GRID, the criteria for the COOPERTITION BONUS is no longer met, and the threshold for the SUSTAINABILITY BONUS is 5 LINKS.

(Asked by **5347** answered Jan 17th 23)

Q65 Charging station docking during AUTO

Q: During AUTO, to be considered docked on the charging station, does a robot need to leave the community zone before docking, or can the robot go directly from their respective community directly onto charging station to earn points?

A: A ROBOT can earn points for being DOCKED on its CHARGE STATION without having left its COMMUNITY.

(Asked by **4238** answered Jan 16th 23)

Q66 Disconnecting battery during a match

Q: If, during a match, a robot has the main battery electrically disconnect but the battery remains mechanically secured to the robot, no foul is called. Assuming that R606 is not violated, is there any rule that would be violated by a robot purposefully disconnecting it's main battery during a match before the arena timer displays 0?

A: While there is no rule explicitly against disconnecting your own battery, note that no electronics permitting this (other than the main breaker) may be inserted between the battery connection and power distribution device per !R609 and !R625. If you are mechanically actuating the main breaker for this purpose, make sure it is still safely accessible for humans to operate per !R613.

(Asked by **4039** answered Jan 17th 23)

Q67 G109 Extension cases G and H clarification

Q: G109 prohibits extension in multiple directions. Case G shows exception for "momentary" extensions in multiple directions. Case G shows arm with no width allowing it to be over the corner only momentarily. If, however, the arm has a small 12 inch wide claw on it. Then it would only project over one side of the robot most of the time, but the rotation between adjacent sides would then no longer be momentary. This is not hypothetical.

A: We do not understand your question. Please rephrase and resubmit.

(Asked by **6964** answered Jan 16th 23)

Q68 g109, arm on turret, and 12 inch wide claw

Q: We have a 12" wide claw on end of a 1" thick arm. Oriented directly forward, arm & claw are both within projection of front frame side. Oriented directly sideways, arm & claw are both within projection of the side frame. Rotating from front to side, arm of robot complies with case G in rule G109 as it is momentary. However, at some point during a rotation, the 12" wide claw seems more like case H, now the robot extension will like case H for about 0.5 seconds, which might not be momentary

A: Good point. Please see [Team Update 03]

(<https://firstfrc.blob.core.windows.net/frc2023/Manual/TeamUpdates/TeamUpdate03.pdf>). Please also review the definition of MOMENTARY. If those 2 resources don't answer your question, please rephrase and resubmit.

(Asked by **6964** answered Jan 17th 23)

Q69 Bumper plywood cross section question

Q: Rule R408 specifies "...backed by 3/4 in. thick (nominal, ~19mm) by 5 in. \pm 1/2 in. (~127 mm \pm 12.7 mm) tall plywood...", that means the cross section of the plywood must be 3/4" wide by 4.5" to 5.5" high. Our question is if both sides of the cross section must have the same height? An example of uneven heights would be 4.6" tall next to the pool noodles and 5.4" tall next to the frame perimeter. Since both heights are within the legal range, would this be allowed?

A: There are no requirements that the cross-section of the plywood backing be rectangular.

(Asked by **4561** answered Jan 17th 23)

Q70 What surface area constitutes docked?

Q: Section 6.4.2 says that "A ROBOT is DOCKED if it is contacting only the CHARGE STATION and/or other items also directly or transitively fully supported by the CHARGE STATION." - Does the specification of the "CHARGE STATION" include the polycarbonate ramps on the sides of the long end of the charge station or just the 4' x 8' surface in the center?

A: The CHARGE STATION is the entire structure described in Section 5.4.

(Asked by **4561** answered Jan 17th 23)

Q71 We can't find the official weight of the charging station

Q: Our mentors can not locate the official weight of the charging station. Where can we find the official weight of the charging station.

A: Per page 6 in drawing GE-23300 found in the [Game Specific elements drawing package]

(<https://firstfrc.blob.core.windows.net/frc2023/FieldAssets/2023FieldDrawings-CHARGEDUPSpecific.pdf>), the "Pivoting assembly of field CHARGE STATION has a CAD-estimated weight of 209 lbs". No weight is provided for the full assembly, but can be derived from the provided official CAD models on the [Playing Field Page](<https://www.firstinspires.org/robotics/frc/playing-field>).

(Asked by **5468** answered Jan 17th 23)

Q72 Driving on Rails

Q: Can a robot drive on top of the metal support rails between the hybrid nodes?

A: There are no rules that prohibit this.

(Asked by **5090** answered Jan 17th 23)

Q73 Q53 FRAME PERIMETER projection follow-up G109-A - Swinging Between projections

Q: TU2 and Q53 clarify the FRAME PERIMETER projection, but... Blue Box ROBOT G shows a swinging mechanism between 2 projections as OK "as long as the extension does not exceed the definition of MOMENTARY when positioned over the BUMPER corner." Is that still correct (and with correct language with regard to the BUMPER corner) given there is now significant area and distance between the 2 projections such an extension would need to cross?

A: Yes. Please see [Team Update 03]

(<https://firstfrc.blob.core.windows.net/frc2023/Manual/TeamUpdates/TeamUpdate03.pdf>) and the definition of MOMENTARY for further detail.

(Asked by **5881** answered Jan 17th 23)

Q74 Single Substation Game Piece Introduction

Q: When introducing game pieces to the field from the Single Substation, does the game piece need to touch the ramp within the Portal?

A: There are no rules requiring the GAME PIECE to touch any specific part of the SINGLE SUBSTATION when being introduced into the FIELD.

(Asked by **3683** answered Jan 17th 23)

Q75 Clarification of Woodie Flowers submission?

Q: Can a team nominate someone for the Woodie Flowers Award and someone separate for the Woodie Flowers Finalist Award for Championship?

A: Each team is allowed to nominate 1 mentor for the Woodie Flowers Finalist Awards. Teams who have mentors who have previously won the Woodie Flowers Finalist Award may also submit 1 mentor for the Woodie Flowers Award.

(Asked by **1501** answered Jan 17th 23)

Q76 Starting Configuration Tape/Carpet

Q: We were wondering if we could get some clarification on rule H309. H309 states that the ROBOT must be fully supported by the FIELD carpet at the start of the MATCH. It is our interpretation that the "FIELD carpet" includes the gaffers tape on the field. Is this interpretation correct; can a ROBOT start the MATCH in contact with the Gaffers Tape as long as it is still fully within its COMMUNITY and no other violations are broken?

A: Please see [Team Update 03]

(<https://firstfrc.blob.core.windows.net/frc2023/Manual/TeamUpdates/TeamUpdate03.pdf>). If that doesn't answer

your question, please rephrase and resubmit.

(Asked by **5347** answered Jan 18th 23)

Q77 Clarification of Q49 answer on Staged Game Pieces

Q: The answer to Q49 states, "The MATCH will only start if there is a GAME PIECE covering or surrounding each STAGING MARK". Can you confirm that this should read "...covering or surrounding the CENTER OF each STAGING MARK" such that the whole staging mark doesn't need to be covered and just the center point of it.

A: Good catch. The answer has been edited as suggested.

(Asked by **5550** answered Jan 20th 23)

Q78 Is the Charge Station level?

Q: The charge station has to be level during the competition to score the most points. What is the +/- tolerance on what is considered to be level?

A: As noted in section 5.4, a CHARGE STATION is considered LEVEL if it is within approximately 2½° of parallel to FIELD carpet.

(Asked by **1720** answered Jan 18th 23)

Q79 When is parking scored?

Q: We were not sure when Parking is scored, section 6.4 seems to indicate it's scored throughout the match as it is not indicated in one of the exceptions A through D. Does this mean that parking scores are finalized at the end of the match and not 3 seconds after? Would this mean that if a robot slid off the charge station after T=0, but before three seconds have passed, that it would not score points for docking or parking since it was not parked at T=0? Also we can't find "park" in the glossary.

A: Good catch! Please see [Team Update 04] (<https://firstfrc.blob.core.windows.net/frc2023/Manual/TeamUpdates/TeamUpdate04.pdf>). If that doesn't answer your question, please rephrase and resubmit.

(Asked by **5347** answered Jan 20th 23)

Q80 g109, arm on turret, slow rotation

Q: This is a continuation of Q68. So, if a robot with an arm terminating in a 12 inch wide claw could rotate from the front of the robot to the side of the robot without incurring a foul. But, if it were to rotate slowly, and take more than 3 seconds, this would then incur a foul.

A: If a ROBOT outside its LOADING ZONE or COMMUNITY takes longer than a MOMENTARY amount of time to rotate an extension from one side of the FRAME PERIMETER to an adjacent side, it receives a FOUL per !G109.

(Asked by **6964** answered Jan 18th 23)

Q81 What happens if a cube is "stuck" in a robot because it pops?

Q: What if a robot is unable to eject a game piece because, say, a cube popped? Will fouls be awarded under G403 if the robot attempts to pick up another game piece?

A: !G403 makes no exceptions for a popped CUBE (or otherwise compromised GAME PIECE).

(Asked by **1038** answered Jan 18th 23)

Q82 Extending in multiple directions, wire extension exception clarification.

Q: G109 States that MOMENTARY and inconsequential actions include wire or cable tie swinging. What action counts as inconsequential? Does a tread that spin outside of one of the projections (that's supposed to centralize a game piece) count as an inconsequential action? and does a tread count as a wire or cable tie leaving the projection? if the tread was a cable tie would it be legal?

A: There is no formal definition of "inconsequential". Generally, inconsequential actions are those that, as perceived by a REFEREE, do not have an impact on the designed functionality of the ROBOT to play CHARGED UP. For example, if a tread were to flap outside the FRAME PERIMETER due to a mechanical failure on the ROBOT, and the movement of the tread had no impact on the designed functionality of the ROBOT, the movement of the tread would be considered inconsequential. Conversely, if the ROBOT is designed such that the movement of the tread is it's intended function, that movement is consequential. (Please see !Q50 for another question similar to this.) These examples hold for wires, cable ties, etc.

(Asked by **5990** answered Jan 19th 23)

Q83 Driver Station Light String Fill

Q: We understand that the inner 13 lights on the DRIVER STATION that denote LINKS scored fill by 20% per LINK scored. We are wondering if this means that each time a LINK is scored, exactly 3 more lights fill in, or if the amount of lights lit up is rounded (ie: 2 LINKS: 40% of the lights = 5.2 lights --> rounded down to 5 lights)?

A: The light strings represent decimals of lights by their brightness. Per your example, 2 LINKS activate 5.2 lights. This becomes 5 lights at 100% brightness and 1 light at 20% brightness.

(Asked by **5347** answered Jan 19th 23)

Q84 "Attaching to" compared to Increasing Traction?

Q: At what point is a robot considered attaching to a field as opposed to having reasonable traction with the field? KoP Chassis wheels do not attach to the field but provide grip. What about tank treads that provide a large surface area in contact with the field at once? What if a robot were to extend a "foot" of high grip material downward to improve stability without moving the frame of the robot?

A: Using a material to increase the coefficient of friction between the CHARGE STATION and the part of the ROBOT contacting the CHARGE STATION is not considered attaching to the CHARGE STATION.

(Asked by **6352** answered Jan 19th 23)

Q85 The bumper rules permit OSB, plywood, and solid wood. Would MDF be permitted?

Q: The bumper rules permit OSB, plywood, and solid wood. Would MDF be permitted? What restrictions are there on the type of plywood?

A: MDF is a type of fiberboard which is not permitted per !R408-A.

(Asked by **5856** answered Jan 19th 23)

Q86 Can power wires of motors be branched?

Q: We want to use a slip ring but couldn't find COTS slip rings supporting 40A power. Can we branch a pair of 12awg cables (on a 40A fused circuit) into four and use a COTS 30A slip ring with at least four inputs and outputs instead? We would also re-combine the branched wires into a pair of 12awg cables again when they passed the slip ring

A: No, this would not meet the requirements of !R623.

(Asked by **6907** answered Jan 19th 23)

Q87 Multiple Pressure Regulators

Q: R808 specifies that working air pressure "must be provided through a single primary adjustable, relieving, pressure regulator." Is it possible to have a second pressure regulator on the working side to reduce pressure further? For example, air from the storage side goes through the "primary" pressure regulator set to 60 psi then goes to another pressure regulator set to 30 psi. Thus, solenoids could be fed by either 30 or 60 psi.

A: There are no rules that prohibit additional regulators "down stream" from the primary regulator.

(Asked by **1025** answered Jan 19th 23)

Q88 Wired Alliance Communication Devices (H303)

Q: Can powered devices communicate over wired connections to a similar device used by alliance members at an adjacent drive station? The devices in this scenario would NOT be connected to the OPERATOR CONSOLE or communicating with a ROBOT. These devices would be used for the purposes of planning or tracking strategy (H303.E).

A: Please see [Team Update 05]

(<https://firstfrc.blob.core.windows.net/frc2023/Manual/TeamUpdates/TeamUpdate05.pdf>). If that doesn't answer your question, please rephrase and resubmit. Please note that there are no rules that prohibit teams within an ALLIANCE from sharing a wired strategy tool. Devices brought to the ARENA must not be, or used in a way that could be considered, a risk to personal safety. A tether that spans DRIVER STATIONS could be considered a tripping or engagement hazard depending on its implementation. Additionally, please keep in mind !H301 to ensure there is no delay of the MATCH.

(Asked by **1540** answered Jan 24th 23)

Q89 Drive Coach Devices

Q: Can drive coaches interact with powered devices intended for strategy (H303.E)?

A: Yes

(Asked by **1540** answered Jan 20th 23)

Q90 Can approved motors power fans

Q: In R501, "Fans" are mentioned as an "allowable motor" with some restrictions: 10 watts, 120mm, 12v. Do these restrictions apply if the fan is turned by an approved motor, e.g. the Sparik MAX/REV NEO?

A: There are no rules that prohibit using a permitted motor to power a fan.

(Asked by **100** answered Jan 20th 23)

Q91 Charging Station Evaluation at end of Auto

Q: As stated in Section 6.4, subsection A, "assessment of CHARGE STATION scoring occurs 3 seconds after the ARENA timer displays 0 following AUTO" Does that mean REFEREE's have up to 3 seconds to complete that evaluation, or will be evaluation be completed at the 3-second mark after AUTONOMOUS has ended.

A: This means the evaluation is completed at the 3-second mark after AUTONOMOUS has ended.

(Asked by **4786** answered Jan 20th 23)

Q92 Does Disabled outputs include Drive Station data

Q: Under 6.5 Rule Violations definitions DISABLED - the state in which a ROBOT is commanded to deactivate all outputs, rendering the ROBOT inoperable for the remainder of the MATCH. Is this intended to include output to the Drive Station as well as the Robot itself? For example: telemetry and video streams from both the RoboRIO and co-processors may be active. We would like to display autonomous settings on the dashboard before match start. These are outputs even though the robot itself is ino

A: A DISABLED ROBOT is still able to send signals to its OPERATOR CONSOLE; only its outputs to actuators are deactivated.

(Asked by **4662** answered Jan 23rd 23)

Q93 Is urethane not a plastic?

Q: Hello! "1000D Cordura" fabric, which was provided in the rookie kickoff kit, and is recommended as a bumper material in the blue box under R408, is typically coated in polyurethane on one or both sides. TU04 indicates that "plastic coated fabrics... are not compliant..." Is polyurethane not considered a plastic for the purposes of this rule? Thanks and have a great weekend! Nate FRC 2363

A: Please see [Team Update 05]

(<https://firstfrc.blob.core.windows.net/frc2023/Manual/TeamUpdates/TeamUpdate05.pdf>). If that doesn't answer your question, please rephrase and resubmit.

(Asked by **2363** answered Jan 24th 23)

Q94 REV and CTRE Electrical Modules

Q: Can I power the REV pneumatic and radio power modules from the CTRE PDP directly? Or do I run the pneumatic module directly off the PDP and the radio power off of the VRM?

A: Per !R616, the radio is powered by a VRM *or* an RPM. The power regulating device (VRM *or* RPM) sources power as described in !R617 (directly from the designated terminals on the PDP or PDH, not through a VRM). The PH sources power either from a single protected 12VDC WAGO connector pair of the PDP/PDH, per !R610 and as shown in [this layout diagram](https://docs.wpilib.org/en/stable/_images/frc-control-system-layout-rev.svg), or from the second pair of fuse protected terminals on the PDP as described in !R617-A

(Asked by 7117 answered Jan 23rd 23)

Q95 Interpretation of rules with multiple penalties

Q: We had a few questions on how to read rules when violations have multiple levels of penalties, how many times those penalties apply. Using G302 as an example... would multiple crosses of the CENTERLINE by a ROBOT result in multiple FOULS? Would contacting an opponent ROBOT add a TECH FOUL, or would the TECH FOUL replace the FOUL? Would contact multiple times with an opponent ROBOT only result in one TECH FOUL or multiple?, what if two different opponents are contacted?

A: Penalties apply per violation of the rule, and compound depending on the circumstances. Using !G302 as an example, if a ROBOT intersects the infinite vertical volume created by the CENTER LINE of the FIELD 2 times during AUTO, 2 FOULS are called. If, during 1 of those intersections, the ROBOT makes contact with an opponent ROBOT, 1 TECH FOUL is also assessed.

(Asked by 5347 answered Jan 23rd 23)

Q96 Compressor Operation with Solenoid Code

Q: When using Java to program for FRC, is the compressor supposed to start when any solenoid code is used or do I have to start the compressor separately. We are having trouble with our compressor not starting automatically when using solenoid code.

A: The purpose of this Q&A is to answer questions regarding the rules of CHARGED UP. For technical assistance, please visit the [FIRST Forums](<https://forums.firstinspires.org/forum/general-discussions/first-programs/first-robotics-competition>).

(Asked by 5282 answered Jan 22nd 23)

Q97 Taking game pieces off staging marks

Q: Can you take game pieces placed by the opposing alliance on their staging marks during teleop?

A: There are no rules that prohibit this.

(Asked by 2168 answered Jan 22nd 23)

Q98 G301 Clarification on using a FIELD ELEMENT to align an extension of the ROBOT

Q: If a team consequentially/intentionally uses FIELD ELEMENTS, either in the COMMUNITY and/or LOADING ZONE, in such a manner that it aligns, slides and/or rests an extension of the ROBOT on or against said FIELD ELEMENTS, and it is NOT supporting the weight of the ROBOT, and said use does not damage the field, is not grasping or grabbing or suspending from a FIELD ELEMENT, neither is it snug, encompassing or otherwise gripping or blocking a FIELD ELEMENT, would such contact be in violation of G301

A: We cannot comment absolutely on hypothetical scenarios. The ultimate decision would be determined by the REFEREES at your event, with the final call made by the Head REFEREE. Generally, touching or reacting against ARENA elements are not violations of !G301, unless the ROBOT is acting in a way that violates !G301.

(Asked by **3990** answered Jan 23rd 23)

Q99 G109 Momentary extension

Q: Can the elbow of a jointed arm momentarily swing out of the frame perimeter on the back side while the arm extends out the front side? And does this apply to both community and loading zone? Or can it be outside of both sides in the community zone?

A: !G109 does not apply to a ROBOT that is fully contained within its LOADING ZONE or COMMUNITY. As noted in !Q50 a ROBOT purposefully extending part of itself outside the boundaries in !G109 is likely consequential and thus is a violation of the rule.

(Asked by **2252** answered Jan 23rd 23)

Q100 Addition to battery assembly

Q: R609 describes how a battery assembly is legally assembled. It pertains mostly to the electrical specifications which shall include 6 AWG wire or larger and Anderson SB connector. Is it legal to permanently install a mechanical fixture onto the battery to orient the SB connector in a very specific orientation. All batteries would be installed with one of these fixture. Fixture is purely mechanical and won't affect electrical behavior. A fixture would be included with the robot weight.

A: Provided such a fixture does not involve physically modifying the battery (i.e. the battery is the same after removing the fixture as it was before it was installed) and is included in the ROBOT weight per !R103, there are no rules explicitly prohibiting this.

(Asked by **9312** answered Jan 23rd 23)

Q101 Rule R707 : Would it be possible to exclude NFC Near-field Communications

Q: Rule R707 states "No other wireless allowed." Would it be possible to exclude NFC Near-field Communications to enable teams to collect data like What Battery is currently installed in their robot using the WPILib data logging features by adding a RFID tag to each battery with unique ID's and low power RFID reader. Could a system like this be installed and disabled during the match to adhere to the rule similarly to rules of software robot extension limits?

A: Thank you for the suggestion. We have no plans to edit !R707 for the 2023 season to allow NFC.

(Asked by **4607** answered Jan 23rd 23)

Q102 Clarification on bumper wood pocketing

Q: R408 this year gained a clause about what small pockets and access holes in bumper wood backing are permitted for. Is it allowed to have a pocket that part of the bumper mounting hardware attached to the bumper sits in? It's not a R101 protrusion (part of bumper not robot) but also doesn't seem to my read of the rule to be "access" to mounting hardware, it just is the mounting hardware recessed into the wood to better align on the robot frame.

A: Please see [Team Update 06]

(<https://firstfrc.blob.core.windows.net/frc2023/Manual/TeamUpdates/TeamUpdate06.pdf>). If that doesn't answer your question, please rephrase and resubmit.

(Asked by **857** answered Jan 27th 23)

Q103 Bumpers Constructed with a 45 degree miter cut on opening of Frame?

Q: If a ROBOT has a frame opening on one side that is 11" wide with a FRAME PERIMETER supported on either side of the opening which is 8" long a bumper can meet the construction rules of R410 the backing of the bumper correctly supported. Is there a ruling that we can not 45 degree miter cut the two 8" bumper sections perpendicular to the FRAME PERIMETER opening entry? R401 only shows 90 degree pool noodles. Opposite 45 degree miter cut bumpers would create a "funnel" into the frame opening.

A: A mitered end of a BUMPER segment (other than to facilitate a connection to another BUMPER segment in a corner) does not comply with R408-C (among others) as illustrated in Figure 9-7.

(Asked by **1501** answered Jan 23rd 23)

Q104 G109 More than 1 arm

Q: Is having more than one arm on one side allowed? Or is one above the other allowed as well? In addition, how is Example ROBOT D not violating G109? For example, ROBOT D has more than 1 extension on same side next to each other.

A: Per !G109, the ROBOT may extend over their FRAME PERIMETER in one direction at a time. !G109 sets no requirement for the number of extensions (or "arms") that may extend over that single direction at a time.

(Asked by **8575** answered Jan 24th 23)

Q106 G109 Extension in Multiple Directions

Q: Is a robot contained fully in its loading zone or community allowed to have an arm that is in a position which causes it to stick out the front and back side of the robot? Either momentarily or not momentarily? G109 Originally read as if this was legal. In team update 3 this was added... , and C. MOMENTARY movement of a MECHANISM from 1 FRAME PERIMETER side to an adjacent FRAME PERIMETER side.

A: The exceptions listed in !G109 are independent. A ROBOT meeting either A, B, or C is exempt from !G109.

(Asked by **2252** answered Jan 25th 23)

Q107 Communicating with the human player

Q: How does the TU5 change to H303 part E, "devices used solely for planning, tracking, and communicating strategy within the same designated area (e.g. ALLIANCE AREA) interact with part B, "non-powered signaling devices"? Can a team use a non-powered signaling device to communicate strategy across the field between drivers and human player?

A: Yes, per !H303-B a team may use a non-powered signaling device to communicate strategy across the FIELD between the DRIVERS and/or COACH and the HUMAN PLAYER.

(Asked by **2177** answered Jan 25th 23)

Q108 G102 and touching game pieces

Q: Hi HQ Staff, We would like some clarification on this clause in G102: "except for MOMENTARY incursions into PORTALS." Does this allow robots to momentarily contact the portal surfaces and/or game pieces that are in the portal? Thank you and have a deLIGHTful day! - Spectrum

A: *updated Jan 27, 2023 per [Team Update 06] (<https://firstfrc.blob.core.windows.net/frc2023/Manual/TeamUpdates/TeamUpdate06.pdf>). Indeed it does (unless !H506 is violated).

(Asked by **3847** answered Jan 25th 23)

Q109 R408e Question: metal types

Q: R408e states that bumpers may "optionally use metal angle, as shown in Figure 9-7 or other fasteners (e.g. staples, screws, adhesives, etc.) to clamp cloth. " The image after R408g shows this optional metal angle, but specifies that it is aluminum. Is it required that aluminum be the material for this angle be aluminum or can it be any metal such as steel?

A: There are no requirements that the metal used for !R408-E be aluminum.

(Asked by **694** answered Jan 25th 23)

Q110 Human Player Field Element Capacity

Q: How many field elements can the Human Player have possession of at any time?

A: There is no rule limiting the amount of GAME PIECES or GAME PIECE Holders a HUMAN PLAYER can have possession of at any time.

(Asked by **2543** answered Jan 26th 23)

Q111 Human Player Substation Movement

Q: Can the Human Player use different Substations during the match?

A: There is no rule limiting a HUMAN PLAYER to either SUBSTATION

(Asked by **2543** answered Jan 26th 23)

Q112 G102 and H505?

Q: Hello again HQ Staff, Thank you for your answer to Q108. G102 and H505 allow a robot and a human player to occupy the single substation portal volume for momentary amounts of time. Would either rule be violated if a Human Player and a Robot were both contacting a portal or a game piece contained in the portal simultaneously? For example, if a Human Player was touching a game piece that is also contacting a robot. Thank you - Spectrum

A: Please see [Team Update 06]

(<https://firstfrc.blob.core.windows.net/frc2023/Manual/TeamUpdates/TeamUpdate06.pdf>). If that doesn't answer your question, please rephrase and resubmit.

(Asked by **3847** answered Jan 27th 23)

Q114 5.4 CHARGE STATION dimensional clarification

Q: In 5.4 CHARGE STATION, the dimensions in figures Figure 5-9 LEVEL CHARGE STATION and Figure 5-10 Fully tilted CHARGE STATION there seems to be inconsistency unless the length of one or more of the following dimensions change when going from level to fully tilted: base: 6' 4 1/8"; top: 4'; 17.0127" inclines (using the 34 1/4 degrees) determined from Figure 5-9 LEVEL CHARGE STATION. These length measurements are not compatible when using the values of degrees given in 5-9 LEVEL CHARGE STATION.

A: The 6 ft. 4 1/8 in. base dimension shown in Figure 5-9 depicts the farthest extents of the CHARGE STATION when it is level, it is not indicative of the dimension between the ramps in any position. For more detailed component dimensions of the CHARGE STATION, see the official CAD or drawing packages provided on the [Playing Field page](<https://www.firstinspires.org/robotics/frc/playing-field>).

(Asked by **9257** answered Jan 26th 23)

Q116 G106 Temporarily Exceeding 6' 6" height limit.

Q: Rule G106 says that "ROBOT height, as measured when it's resting normally on a flat floor, may not exceed 6 ft. 6 in." Is it legal for a robot arm to rotate vertically to flip around and temporarily exceed this height, since this would not considered a "resting" configuration for the arm?

A: There are no exceptions to !G106.

(Asked by **5052** answered Jan 27th 23)

Q117 Portal clarification

Q: We are clarifying that the portal in the double substation only includes the rectangular prism created by the bent polycarbonate and the window. A robot that extends between the grates but is under this prism is considered not in the portal and thus complies with H506.

A: Yes

(Asked by **5024** answered Jan 30th 23)

Q118 Bumper Numbers

Q: Regarding the team number on bumpers, does a 'glitter white' qualify as an acceptable vinyl material to use for our team number? The numbers are clearly visible and appear plain white from a farther distance. The glitter adds a slight texture, but not found to be abrasive in match play. Would the bumpers remain legal with glitter numbering?

A: Vinyl, paint, or other marking material that is sold as white meets the requirement described in !R406 part A.

(Asked by **9008** answered Jan 30th 23)

Q119 Can a custom circuit include an Electromagnet?

Q: Can an electromagnet, like the ones on a security door, be used to restrain movement on a robot as long as it is only causing an attraction force to a steel plate? I don't think it will be considered an actuator under R501 if it doesn't induce movement. Would this be legal as a custom circuit if it does not produce voltages over 24V (per R614) and does not exceed part cost limits?

A: We cannot rule absolutely on hypothetical ROBOT designs, and the final decision as to legality of a particular ROBOT lies with the Lead ROBOT Inspector (LRI) at each event. Please note that an electromagnet that causes readily discernible motion when energized or de-energized is considered an actuator and therefore needs to meet the requirements of !R501. An electromagnet that does not cause readily discernible motion is not an actuator and therefore does not need to meet the requirements of !R501. Such a device is considered a CUSTOM CIRCUIT, and must follow all the rules required of that classification.

(Asked by **1939** answered Jan 30th 23)

Q120 Can shuttle valves be used?

Q: Shuttle valves were ruled legal by Q&A in 2018, are they still legal this year? E.g. <https://www.mcmaster.com/valves/valve-type~shuttle/> They shuttle output pressure to a cylinder between two solenoid valves that supply different pressures. Only one solenoid valve is connected to the cylinder at a time.

A: Yes, the output of multiple solenoids may be plumbed to the same device without violating !R814, provided the team can prove that the outputs are never combined together.

(Asked by **95** answered Jan 30th 23)

Q121 Can fans be powered by solenoid terminals in

Q: May we power two 12v 60mA fans from a pneumatic hub solenoid channel? The channel is rated for 200mA. R503 is non-specific about this legality. R710 C does not specifically allow solenoid channels for this usage. However, it seems a reasonable use of the PCH, and offers more control than simply connecting them to the PDH.

A: There are no rules explicitly constraining or restricting power sources for fans.

(Asked by **95** answered Jan 30th 23)

Q122 Bill of Materials

Q: Is a bill or materials required this year?

A: No

(Asked by 7772 answered Jan 30th 23)

Q123 Bumper dimensions for notched frame

Q: If a ROBOT has a square 27" frame perimeter and has a 13" opening centered on one side, with FRAME PERIMETER supported 6" long bumper sections on each side of the opening (in addition to full coverage on all other sides), is it acceptable for the 1" of frame on each side of the opening to be left exposed? R401 says outside corners & Figure 9-3 shows exposed frame on the left with a legal 6" bumper section, and on the right there is a tiny amount of frame visible next to the "Not a bumper" item.

A: We cannot rule absolutely on the legality of specific designs, and the final decision as to legality of a particular ROBOT lies with the Lead ROBOT Inspector (LRI) at each event. Questions in the vein of "is this design legal" are explicitly mentioned as types of questions that will not be answered in [Section 1 of the Game Manual](<https://firstfrc.blob.core.windows.net/frc2023/Manual/2023FRCGameManual.pdf>). If there is a rule that you think is unclear, please rephrase and resubmit.

(Asked by 5892 answered Jan 30th 23)

Q124 Sixteenth Alliance Member included in Alliance Advancement Points?

Q: Hi HQ staff, we had a question about Playoff Round Performance points. Section 11.8.1.3 states that a team only earns the percentage of Alliance Advancement Points of the won Playoff Matches that they played in. We were wondering if this only includes teams on a LINEUP, or if being a sixteenth ALLIANCE member from a team not in the LINEUP (as mentioned in section 11.7.4.1) counts as a team participating in a Playoff MATCH and thus earns Alliance Advancement Points for that MATCH?

A: Only ROBOTS on the LINEUP earn Alliance Advancement Points for that MATCH.

(Asked by 5347 answered Jan 30th 23)

Q125 Force required to tip charging station

Q: Does anyone know what force (applied vertically, at the edge of the main platform) should be required to tip the charging station? The one we constructed, when properly weighted, seems to require too large a force.

A: The purpose of this Q&A is to answer questions regarding the rules of CHARGED UP. Any measurements or materials information can be derived from the [official Field Drawings] (<https://www.firstinspires.org/robotics/frc/playing-field#FIRSTDrawings>), or other tools available on the [Playing Field page] (<https://www.firstinspires.org/robotics/frc/playing-field>).

(Asked by 4342 answered Jan 30th 23)

Q126 Can a robot signal the Human Player which Gamepiece to deliver?

Q: Can a driver use LED's on their robot approaching the substation to signal the human player which game piece to deliver to the robot?

A: There is no rule that prohibits a ROBOT from signaling to the HUMAN PLAYER.

(Asked by **997** answered Jan 30th 23)

Q127 Are 1-to-2 wire connectors allowed for motor power wires (40A)?

Q: Given that there're existing 1-to-2 COTS wire connectors, rated for 40A(12AWG) wires, can a 12AWG motor wire be connected to two parallel 12AWG wires (using the given connector) and recombined into one 12AWG wire (using the same connector), and then plugged into the PDP? For example, the ground wire (black one) from the motor to PDP would look like this: motor ---- connector ===== connector ----- PDP port, where "-" represents a single 12AWG wire and "=" represents two 12AWG wires in parallel.

A: There are no rules explicitly prohibiting this. Please pay close attention to !R623 and !R624.

(Asked by **6907** answered Jan 30th 23)

Q128 Using Snap Action Breakers in REV PDH

Q: Our team has noticed that the Snap Action Breakers have longer legs than the REV Breakers. Our question is -- Is it allowable to either 1) Use insulating Material (Heat Shrink Tubing) to insulate the exposed conductor or 2) Trim the end of the leg so it will seat all the way into the PDH. Thank you for your time.

A: Please see [Team Update 07]

(<https://firstfrc.blob.core.windows.net/frc2023/Manual/TeamUpdates/TeamUpdate07.pdf>). If that doesn't answer your question, please rephrase and resubmit.

(Asked by **9003** answered Jan 31st 23)

Q129 R102 and R104 Game Piece Overhang

Q: R102 states that no part of the robot can hang out over the frame perimeter at the start of the match. R104 states that the robot must be below 4ft 6in at the start of the match. Can a preloaded game piece held by the robot at the start of the match be hanging out over the frame perimeter and/or sticking up above the 4ft 6in height limit provided that no part of the robot structure violates these rules?

A: There are no requirements that a preloaded GAME PIECE be in the ROBOT'S STARTING CONFIGURATION at the start of a MATCH.

(Asked by **2603** answered Jan 31st 23)

Q130 G302 & G303 and the 3 second delay between AUTO and TELEOP

Q: Good evening HQ staff, The answer to Q46 states that "AUTO rules no longer apply" after the timer reaches 0 at the end of the auto period. Does this also mean that if a robot were to cross the center line or "interfere with opponent GAME PIECES" during this disabled period that they would not be penalized since those actions

didn't happen during the autonomous period? The robot would not be scoring, de-scoring, or interfering with the opponent's charge station or grid. Thank you. Spectrum

A: Please see [Team Update 08]

(<https://firstfrc.blob.core.windows.net/frc2023/Manual/TeamUpdates/TeamUpdate08.pdf>). If that doesn't answer your question, please rephrase and resubmit.

(Asked by **3847** answered Feb 3rd 23)

Q131 Extension limit and angle of arm

Q: The extension limit is 48". If our robot arm extends to less then 48" when at an angle but when flat extends past 48". If we have code to not let it lower without retracting are we within the rules?

A: !R105 can be met by physical or software constraints/controls.

(Asked by **3537** answered Feb 1st 23)

Q132 Coopertition Bonus requirement

Q: To achieve the Coopertition Bonus, does A) Red team score in the coop grid within the red community, and the blue team score in the blue coop grid within the blue community, or B) Does the red team score in the coop grid within the blue community, and blue score in the coop grid within the red community? Or C) some other solution not listed here.

A: The COOPERTITION BONUS is triggered by the number of GAME PIECES scored in each CO-OP GRID, regardless of which ALLIANCE put them there. Note that attempting to score on the opponents GRID may put a ROBOT at risk of possible violation of rules such as !G108 and !G207.

(Asked by **8719** answered Feb 1st 23)

Q133 battery mounting on moveing parts

Q: Is there anything wrong with mounting your battery on a part of the robot that will move during the operation of the robot, so long as the battery is well secured?

A: We cannot rule absolutely on hypothetical ROBOT designs, and the final decision as to legality of a particular ROBOT lies with the Lead ROBOT Inspector (LRI) at each event. Any battery mounting method must not cause an unsafe condition per !R203 and must be secured per !R606.

(Asked by **8822** answered Feb 1st 23)

Q134 Cone Node Tape Discrepancy

Q: Hi HQ, We were looking at the drawings for the middle Cone Ramp and we saw that we should place the retroreflective tape on the middle node 8 inches down from the top of the node including the cap. We also checked the Onshape CAD model and found that the tape should be placed 8 inches down not including the cap. Do you know which one is correct? Have a nice day, all the best, -5347

A: Good catch! The 8 in. measurement is inclusive of the cap as corrected in *FIRST *official assets in [Team Update 08](<https://firstfrc.blob.core.windows.net/frc2023/Manual/TeamUpdates/TeamUpdate08.pdf>). it. The

Onshape version is a courtesy model provided by PTC, is unofficial, and has not been reviewed or confirmed by *FIRST* to be 100% accurate, but we will relay this observation. Thank you.

(Asked by 5347 answered Feb 3rd 23)

Q135 Can we use Spikes for leds?

Q: I am curious if it is possible to use spikes to turn off and on LEDs. I know you cannot use them for motors but what about LEDs?

A: The purpose of this Q&A is to answer questions regarding the rules of CHARGED UP. For technical assistance, please visit the [FIRST Forums](<https://forums.firstinspires.org/forum/general-discussions/first-programs/first-robotics-competition>). Using a relay like the Spike to control lights on the ROBOT is considered a CUSTOM CIRCUIT and subject to those rules for legal implementation. (We would also recommend you review !R503-B.)

(Asked by 3537 answered Feb 2nd 23)

Q137 Legality of glow sticks (H303-B)

Q: Are glow sticks considered non-powered signalling devices for purposes of communication with other designated areas? (Glow sticks which activate via bending/cracking, not via battery.)

A: Any device that does not require an electrical source (e.g. battery, outlet) to function is considered a non-powered device.

(Asked by 2526 answered Feb 3rd 23)

Q138 Single Substation, polycarbonate panel?

Q: Hello, I am wondering about a certain field element belonging to the single substation, where cones and cubes slide on a slope. There is an angled polycarbonate panel right below this substation that is zip tied, but is there exact dimensions and angle measurement on this angled panel? If there is, what are the measurement and angle for this panel?

A: The purpose of this Q&A is to answer questions regarding the rules of CHARGED UP. Any measurements or materials information can be derived from the [official Field Drawings](<https://www.firstinspires.org/robotics/frc/playing-field#FIRSTDrawings>), or other tools available on the [Playing Field page](<https://www.firstinspires.org/robotics/frc/playing-field>). The piece you're looking for is called the CHUTE GUARD, part number GE-23214.

(Asked by 3039 answered Feb 6th 23)

Q139 G107 Max Extension in multiple directions with respect to G109

Q: Is max extension inside of the Loading Zone and Community(considering G109 exceptions) limited to 48" total from both sides of your frame, or are you allowed to extend 48" in opposite directions simultaneously from frame perimeter? For example, can you extend two 48" arms inside the community from opposite sides of your bot? Or is it limited to two 24" arms in opposite directions?

A: Per !G107, the maximum distance an extension of the ROBOT may be beyond the FRAME PERIMETER is

48 inches. A ROBOT fully contained within its LOADING ZONE or COMMUNITY is exempt from !G109 per exception B. Thus, a ROBOT fully contained within its LOADING ZONE or COMMUNITY may extend over multiple sides of its FRAME PERIMETER up to 48 inches in each direction.

(Asked by **171** answered Feb 6th 23)

Q140 Raspberry Pi Cooling Regulations

Q: Are fans mounted to and powered by the Raspberry Pi regulated or banned in any way other than the fan regulations from R501? Are heat sinks or other passive cooling systems placed on the Raspberry Pi regulated or banned in any way?

A: We cannot comment on part/design legality, previous calls of Head REFEREES or LRIs, or questions that are overly broad, vague, and/or include no rule references. Please consult [Section 1.10] (<https://firstfrc.blob.core.windows.net/frc2023/Manual/2023FRCGameManual.pdf>) and, if needed, resubmit a different question.

(Asked by **6831** answered Feb 6th 23)

Q142 Max height allowed

Q: Hello ! We have a joint robotic arm that can exceed the max height allowed established on the manual. The thing is that we will never put the arm mechanism in that position on the match, but the mechanism has the ability to exceed that height. Is there a problem with this since we won't use the arm in that position on the field? Note: The starting configuration of our robotic arm does not exceed the starting configuration height allowed.

A: !G106 restricts what a ROBOT does during a MATCH, not what a ROBOT is capable of doing.

(Asked by **6694** answered Feb 6th 23)

Q144 Alignment device for human players at single substation

Q: I saw team 8177 designed an incredible jig that allows human players to drop cones through the single substation in a standardized way. This item need to be brought by the human player and is in contact with the single substation. We want to confirm if this sort of "external" jig/device/thing go against H303?

A: The only equipment that may be brought to the ARENA and used by DRIVE TEAMS during a MATCH is listed in !H303.

(Asked by **6832** answered Feb 6th 23)

Q145 REV Mini Power Module FRC Legal?

Q: I'd like to use a REV mini power module to remotely distribute power to Neo motors. Is this products FRC legal?

A: We cannot comment on part/design legality or questions that are overly broad, vague, and/or include no rule references. Please consult !R503 and !R621 and [Section 1.10] (<https://firstfrc.blob.core.windows.net/frc2023/Manual/2023FRCGameManual.pdf>) and, if needed, submit a revised question.

(Asked by **4325** answered Feb 7th 23)

Q146 Tape in front of Grid

Q: The arrows in figures 5-12 and 5-13 appear to point to the field center edge of the blue tape with a dimension of 4ft 6 1/4 in. Per the official drawings the base of the grid is 4 ft 6 1/4 in. Should the arrow be pointing to the alliance wall side of the tape and thus the end of the grid base? Thank you.

A: Good catch. Thank you! Please see [Team Update 09] (<https://firstfrc.blob.core.windows.net/frc2023/Manual/TeamUpdates/TeamUpdate09.pdf>). If that doesn't answer your question, please rephrase and resubmit.

(Asked by **58** answered Feb 7th 23)

Q147 Noise in "playoff pit areas"

Q: E701 specifically allows the use of power tools in the pits during awards Ceremonies in Playoff MATCHES. At some events teams are allowed to move their pits to be very close to the field during Playoff MATCHES (a "Playoff Pit Area" in E108) to aid teams in quickly repairing and preparing their robots before their next match. Can you confirm that E701 allows the use of power tools in these temporary pit locations next to the field while awards are being presented between Playoff MATCHES?

A: Yes, this is the intent of E701.

(Asked by **2052** answered Feb 7th 23)

Q148 District Team presenting for FIRST Impact at a Regional

Q: With the new update to Championship qualification, District teams cannot advance to the Championship due to awards or performance at a Regional event. Can District teams still present for the FIRST Impact award at Regional events for feedback even though they cannot win the award?

A: No. Only teams that are eligible for the award at the event can present for the award at the event.

(Asked by **4327** answered Feb 7th 23)

Q149 R408- rigid fastening system in a bumper gap?

Q: Hello, R408-G requires a rigid fastening system to mount the bumpers. May a bumper set be constructed such that the "fastening system" extends to the side of a bumper segment or extends between bumper segments. This "fastening system" would cover portions of the frame perimeter that are not also covered by the bumper segments and would be outside of the frame perimeter but would comply with R408-B (1" hard parts rule) "Fastening system" = plates, bolts, etc

A: We cannot rule absolutely on hypothetical ROBOT designs, and the final decision as to legality of a particular ROBOT lies with the Lead ROBOT Inspector (LRI) at each event. Generally, BUMPER fastening elements may not extend beyond the vertical edges of the BUMPER segment such that the BUMPER does not reflect the cross-section in Figure 9-7.

(Asked by **3847** answered Feb 8th 23)

Q150 cone dimensions

Q: 5.8.1 CONE Figure 5-26 CONE There appears to be a necessary dimension missing from the cone dimensioning. The dimension not definitively determinable is the top of the lip to the base datum.

A: Please refer to the introduction language in Section 5, specifically "Illustrations included in this section are for a general visual understanding of the CHARGED UP ARENA... Please refer to the official drawings for exact dimensions, tolerances, and construction details." The drawings also have *more* dimensions than the images presented in the manual. Please refer to the [game specific drawing package (GE-23700)] (<https://firstfrc.blob.core.windows.net/frc2023/FieldAssets/2023FieldDrawings-CHARGEDUPSspecific.pdf>) for additional CONE detail.

(Asked by **9257** answered Feb 7th 23)

Q151 Robot Bumper and Frame < 6"

Q: If a robot has a frame perimeter that is open on one end such that from the corner to the edge of the opening is less than 6 inches does that mean the bumper must cover the entire side or is that a violation of R401?

A: Per !R401 (and shown in Figure 9-3), at least 6 in. (~16 cm) of BUMPER must be placed on each side of each outside corner of the FRAME PERIMETER. If a FRAME PERIMETER side is shorter than 12 in., that entire side must be protected. Designs must be able to accommodate this requirement. The blue box under !R101 describes a good example of how to determine FRAME PERIMETER sides of a ROBOT with frame openings.

(Asked by **6161** answered Feb 7th 23)

Q152 REV NEO 550 on Mini Power Module

Q: We would like to know if it is within regulation to power 2 - Rev NEO 550 motors we plan to run to 2 - 15 amp fuses off a MPM. The rules talk about having to run each motor on it's own fuse off the PDH or PDP but no mention of the MPM which also uses fuses for each connected device. I saw a similar question but it was not clear how they would wire it.

A: Per !R621, each breaker on a PDP/PDH is limited to 1 motor controller. Attaching multiple motor controllers to an intermediate device violates the constraint.

(Asked by **7153** answered Feb 8th 23)

Q153 Is manifold use legal?

Q: 9.8 Pneumatic System--R814 Since it technically plumbs the solenoid outputs together, does the use of a manifold violate: R814 *Don't connect solenoid outputs together. The outputs from multiple solenoid valves must not be plumbed together. Manifolds are an industry standard, so if they do technically violate R814, can an exception be stated before we order a manifold?

A: !R814 prohibits the output of solenoid valves from being plumbed together (i.e. combined). Use of a manifold where the outputs of the solenoids are plumbed through the same device, but not combined, does not violate !R814.

(Asked by **9257** answered Feb 8th 23)

Q154 bumper number colors

Q: is there any specific rule about the color of the number on the bumper that our team can use? can we use any color with a white outline or does the whole number on the bumper need to be white?

A: Per !R406 numbers must be "only white".

(Asked by 7565 answered Feb 8th 23)

Q155 Followup regarding manifolded outputs, inlets, and exhausts

Q: Hello! When a pneumatic solenoid valve actuates, it aligns a source of pressurized air with Side A of a pneumatic cylinder, and it simultaneously aligns Side B of the pneumatic cylinder with a pipe in free communication with the atmosphere. Are there any rules that prevent either (a) the pressurized source or (b) the pipe in free communication with the atmosphere from being manifolded together to support multiple solenoids in parallel? This answer will clarify Q153 & R814. Thank you! Nate

A: Per !R814, switched pressure outputs from multiple solenoid valves must not be plumbed together. Supply from the compressed air source to the valves and exhaust flow from the valves may be combined (e.g. within a COTS valve manifold that is legal per !R804.)

(Asked by 2363 answered Feb 13th 23)

Q156 Using a Spring to Close Grabber

Q: Our team has been working with a concept to use a spring to keep the grabber closed, and using a motor as a winch to open it. The spring is in between two arms forcing them to close. Right now, the prototype is using a basic door spring like this: <https://tinyurl.com/3p6pnbrc> Would this be considered safe and pass inspection, or should we consider a better alternative? It's pretty well secured to the robot, but springs can be unpredictable if they fail.

A: We cannot comment on part/design legality, previous calls of Head REFEREES or LRIs, or questions that are overly broad, vague, and/or include no rule references. Please consult [Section 1.10] (<https://firstfrc.blob.core.windows.net/frc2023/Manual/2023FRCGameManual.pdf>) and, if needed, resubmit a different question.

(Asked by 5929 answered Feb 8th 23)

Q157 11.7.5 Pit Crew Limitations?

Q: This section of the manual explicitly allows 3 additional pit crew members during the Playoffs. What does this mean? May those 3 team members accompany the team to the queueing area to be able to maintain the robot between playoff matches? Can the FTA/HR/event director put limitations on this? Can they change the number of allowed pit crew members? Can they change when the pit crew is allowed to join the drive team? If limitations/exceptions exist can they please be added to the manual? Thanks!

A: Yes, pit crew members may accompany the DRIVE TEAM to the queue and are expected to help DRIVE TEAM members to service the ROBOT as needed (safely). There are no provisions for exceptions where FIELD STAFF can eliminate or modify this allowance.

(Asked by 3847 answered Feb 9th 23)

Q158 Woodie Flowers

Q: if im a mentor and im nominated for woodie flowers but i am also a referee would that affect me being nominated?

A: Nope.

(Asked by **3604** answered Feb 9th 23)

Q159 COTS PWM Servo Outdated \$75 Limit

Q: Since 2017 COTS PWM Servos have been allowed as long a the MSRP is less than \$75. Our team has discovered a new servo: https://www.amazon.com/DOCYKE-SERVO-350B-12V-24V-350Kg-cm-Planetary/dp/B09XDXSFR?ref_=ast_sto_dp We feel that the \$100 price tag would be allowed if servo price had kept up with inflation of the last 5 years. If this can't be done for this year, how do we get this awesome servo approved for future years?

A: The scope of this Q&A system includes and is limited to questions about the [Game Manual] (<https://firstfrc.blob.core.windows.net/frc2023/Manual/2023FRCGameManual.pdf>), [Awards] (<https://www.firstinspires.org/robotics/frc/awards>), [Self-Inspection Checklist] (<https://firstfrc.blob.core.windows.net/frc2022/Manual/2022-inspection-checklist.pdf>), [official Field drawings] (<https://www.firstinspires.org/robotics/frc/playing-field#FIRSTDrawings>), and/or [Event Rules] (<https://www.firstinspires.org/sites/default/files/uploads/frc/EventRulesManual.pdf>). For suggestions or feedback please contact Team Support at [firstroboticscompetition@firstinspires.org] (<mailto:firstroboticscompetition@firstinspires.org>).

(Asked by **6128** answered Feb 9th 23)

Q160 FIRST Q&A answering with Invalid email address

Q: The First Q&A system answered our previous question with advice to contact FIRST at firstroboticscompetitionteams@firstinspires.org. That email was returned by postmaster@firstinspires.org as undeliverable. Is there a valid email address that we can use? Your message to firstroboticscompetitionteams@firstinspires.org couldn't be delivered. [firstroboticscompetitionteams](mailto:firstroboticscompetitionteams@firstinspires.org) wasn't found at [firstinspires.org](https://www.firstinspires.org).

A: Apologies! The correct address is [firstroboticscompetition@firstinspires.org] (firstroboticscompetition@firstinspires.org), and it's been corrected in the answers published so far.

(Asked by **6128** answered Feb 9th 23)

Q161 where to find approved motors

Q: Where can I find the list of all the approved motors?

A: Please see !R501.

(Asked by **4314** answered Feb 9th 23)

Q162 Use of poppet valve to control vacuum for cone/cube pickup

Q: We are using a vacuum pump to pick up the field elements and the normal pneumatic valves can't switch a vacuum. Instead we are using a poppet valve which is 12/24 VDC and about 200 mA similar to <https://www.mcmaster.com/61245K22/> Our question is if this is an actuator which can only be controlled per rule R503.B or if it is considered a custom circuit and can be controlled by something like an Arduino or raspberry pi? The R503.B relays are 10 A and quite oversized for this application.

A: This device would be considered an electric solenoid actuator and may only be controlled as described in the matching row in !R504.

(Asked by **2590** answered Feb 13th 23)

Q163 FTC Blocks Programming Tool Compatibility

Q: We are a rookie team, and we are building our robot using the Kickoff Kit provided by FIRST. We want to use the FTC Blocks Programming Tool as recommended by FIRST for novice programmers.. The documentation that I have read assumes that your robot includes either the REV Control Hub or Expansion Hub, but we have neither. We have the roboRIO 2.0 controller. Will the FTC Blocks Tool work with this setup?

A: Thank you for writing in! As a reminder, the purpose of this Q&A is to answer questions regarding the rules of CHARGED UP. For technical assistance, please visit the [FIRST Forums] (<https://forums.firstinspires.org/forum/general-discussions/first-programs/first-robotics-competition>). You can also find programming information on [WPILib](<https://docs.wpilib.org/en/stable/>).

(Asked by **9158** answered Feb 10th 23)

Q164 Bumper mounted with 1/2" portion of the bottom of the frame exposed

Q: We are using standard kit frame and will have bumpers around entire frame (R401 compliant). Constructed in compliance to R408 with 4.5" backing. Will also be mounted in compliance to R402 (between 2.75" and 7.25" from ground). This will leave a 1/2" portion of the bottom of the frame (all the way around) without bumper coverage. We cannot find a bumper rule this configuration violates, are we interpreting them all correctly?

A: We cannot rule absolutely on hypothetical ROBOT designs, and the final decision as to legality of a particular ROBOT lies with the Lead ROBOT Inspector (LRI) at each event. There are no rules requiring all exposed surfaces of ROBOT frame to be covered by BUMPERS.

(Asked by **3464** answered Feb 10th 23)

Q165 R104 & G106: Different Max Heights

Q: Our robot's frame is built to be around 5 ft. on the basis that G106 states that the Robot's max height "may not exceed 6 ft. 6 in". However, we've recently found that R104 states that the Robot's max height "may not be more than 4 ft. 6 in." in the starting configuration. Does this confirm for us that we need to change the height of the robot to follow R104, and that G106 refers only to robots that vertically extend during the match?

A: A ROBOT must start the MATCH in its STARTING CONFIGURATION (!H309 part C, and what is checked at Inspection to verify compliance with !R104). During the MATCH, the ROBOT may be taller, but not in a way that it violates !G106.

(Asked by **6519** answered Feb 12th 23)

Q166 Clarification of Potential Sequence of Actions for H505, H506, G102

Q: Is it permitted for a DRIVE TEAM member to extend a body part into a PORTAL (for a less-than-MOMENTARY period of time) when no part of a ROBOT is in that PORTAL and then a ROBOT momentarily enters the PORTAL and at no time does the DRIVE TEAM member contact a GAME PIECE in contact with a ROBOT? It appears H505, H506 (due to the use of "extend"), and G102 permit this sequence of actions, but we would like to confirm.

A: Per !H506 part A, if the DRIVE TEAM member and ROBOT occupy the PORTAL at the same time, the violation is a verbal warning. If the occurrence happens again, the violation is a YELLOW CARD. There is no order of operations implied or exception for MOMENTARY periods of time in !H506.

(Asked by **3061** answered Feb 13th 23)

Q167 Climbint the charge station

Q: Can a robot climb the charge station from the side (not the slanted side)? Then, the robotic raises itself enough to wheel itself on the substation. Must the robot use the sloping side of the substation to get to the platform's top?

A: There are no rules requiring the ROBOT to use the lead-in ramps to get on top of the CHARGE STATION but please be aware of !G301.

(Asked by **5031** answered Feb 13th 23)

Q168 Are worm drives allowed to create gear ratios?

Q: We would like to use a worm drive to create a gear ratio of 1:40 after a Falcon500 motor instead of something more "traditional" like a VersaPlanetary gearbox. Is this allowed?

A: We cannot comment on part/design legality, previous calls of Head REFEREES or LRIs, or questions that are overly broad, vague, and/or include no rule references. Please consult [Section 1.10] (<https://firstfrc.blob.core.windows.net/frc2023/Manual/2023FRCGameManual.pdf>). Generally, there are no rules specifically allowing or disallowing certain types of gearboxes, provided all other ROBOT rules are satisfied.

(Asked by **6417** answered Feb 13th 23)

Q169 Vacuum and definition of pneumatic COMPONENTS

Q: Per R804 Blue Box, a device that creates a vacuum is not a "pneumatic device". If, in the vacuum "system" we use a solenoid valve, under negative operating pressure, is that solenoid valve a "pneumatic COMPONENT" subject to R805? Similarly is a solenoid valve a "pneumatic COMPONENT" as that word-pair is otherwise undefined in the manual or is it, in this configuration part of the "device" subject to the R804 Blue Box?

A: A solenoid valve used as part of a vacuum system would not be considered a pneumatic device per a&d of the !R804 Blue Box. It would still be a "pneumatic solenoid valve" or "electric solenoid actuator" and subject to all appropriate rules regarding wiring and powering such as !R504.

(Asked by **5881** answered Feb 13th 23)

Q170 Black Bumper Number Outline

Q: If a Team's WHITE bumper numbers meet the criteria as listed in Rule R406, can a Team include an additional backing layer of an alternate color (e.g. black) that is visible around the white letters (as an offset)? This layer is intended to add additional adhesion to protect the numbers from fraying/peeling.

A: The only markings allowed are those listed in !R405 A-D.

(Asked by **2337** answered Feb 13th 23)

Q171 A claw that Momentarily extends in more then one direction

Q: My team has a claw on our robot used for picking up cones and cubes. The problem with the claw however, is that when the claw is all the way open, it extends past the left and right edges of the frame perimeter. However, it would never extend in such a way for longer than a couple of seconds. I don't think this would be a violation of the rules as I think that this might classify as only momentary extension in multiple directions, but I wanted to make sure before we made a final decision.

A: We cannot comment absolutely on hypothetical scenarios. The ultimate decision would be determined by the REFEREES at your event, with the final call made by the Head REFEREE. A ROBOT purposefully extending part of itself outside the boundaries in !G109 is likely consequential and thus is a violation of the rule.

(Asked by **8057** answered Feb 13th 23)

Q173 Rev Servo Power Module used with WCP Linear Actuator

Q: Are there any rules that prevent the use of a WCP Linear Servo Actuator (6 Volt, 50mm stroke length) that is connected to the Roborio through a Rev Robotics Servo Power Module (Rev Part # REV 11-1144)? We will use a 20 amp or less breaker circuit off the Rev PDH to power the Rev Power Module.

A: We cannot rule absolutely on ROBOT designs, and the final decision as to legality of a particular ROBOT lies with the Lead ROBOT Inspector (LRI) at each event. We believe !R505 applies directly, as well as other rules that legislate wiring requirements, etc. If there are rules you think are unclear, please rephrase and resubmit.

(Asked by **2811** answered Feb 13th 23)

Q174 limits switches

Q: can we use limits switches other than the ones supplied by Andymark. (heavier duty)?

A: There are no rules that require limit switches be purchased from a specific company.

(Asked by **4314** answered Feb 13th 23)

Q175 Definition of "graphic display" in R902

Q: R902 states "The OPERATOR CONSOLE...must include a graphic display to present the Driver Station Software diagnostic information." a) Does the "graphic display" in this rule refer to a physical display (i.e. monitor or laptop screen), or the GUI of the FRC Driver Station software? b) If "graphic display" refers to the

GUI of the Driver Station software, does R902 require that the GUI be visible throughout the match (unobscured by other windows)?

A: A) "Graphic display" refers to the screen to present the Driver Station Software diagnostic information. B) While there is no requirement that the Driver Station software be visible throughout the MATCH, obscuring the Driver Station Software diagnostic information may make it difficult for FIELD Personnel to assist in troubleshooting issues.

(Asked by **1018** answered Feb 14th 23)

Q176 Use of roboRIO as coprocessor

Q: R701 states that "ROBOTS must be controlled via 1 programmable NI roboRIO or roboRIO 2.0". Does this rule prohibit the use of a second NI roboRIO or roboRIO 2.0 as a coprocessor, provided that all commands to enable actuators originate from only one roboRIO?

A: Use of additional roboRIOs does not violate R701 provided all commands to enable actuators originate from a single roboRIO.

(Asked by **1018** answered Feb 13th 23)

Q177 Core control system components as part of a custom circuit

Q: CUSTOM CIRCUIT is defined as "Any active electrical item that is not an actuator...or core control system item (specified in R710)". R710 lists, among other items, "motor controllers" and "relay modules". In the answer to Q135, you said that Spike relay modules used to control LEDs would be considered a custom circuit. Can "core control system items", such as motor controllers and relay modules (such as the Spike), be used in a custom circuit, provided that they are not controlling actuators?

A: Yes. Using a core control system item to control something other than an actuator on the ROBOT is considered a CUSTOM CIRCUIT and subject to those rules for legal implementation.

(Asked by **1018** answered Feb 13th 23)

Q178 R408 and bumper mounting system outside of the bumper zone

Q: Hello, R408-G requires a rigid fastening system to mount the bumpers. May this "fastening system" extend above a bumper segment and be outside of the bumper zone? May part of the fastening system be outside of the frame perimeter (within the 1" hard parts limit established by R408) and above the 7.5 inch max height of the bumper zone. Thank you, Spectrum

A: The BUMPER attachment system may extend above the BUMPER, but any part of the BUMPER attachment system that is part of the BUMPER (per !R408-G) must be located in the BUMPER ZONE per !R402 and any part that is part of the ROBOT must remain within the FRAME PERIMETER.

(Asked by **3847** answered Feb 13th 23)

Q179 R402 Bumper Height on Drop Center Drivetrain

Q: When interpreting bumper zone rule R402, how is "normal" defined? We have a dropped center 6 wheel drivetrain, so the frame (and bumpers) can tilt back and forth slightly. The "normal state" of the robot could be 1

of 2 possible configurations. Do the bumpers need to be fully below 7.5" from the ground regardless of which way the frame tilts, or only when the frame is level?

A: In this scenario, with the ROBOT equally likely to be in either of 2 possible configurations, the BUMPER ZONE requirement must be met in both configurations.

(Asked by **451** answered Feb 14th 23)

Q180 Hook on Loop type materials on bumpers

Q: Per R405 note B, "hook-and-loop tape or snap fasteners backed by the hard parts of the BUMPER" are allowed to be visible on bumpers. Are materials that are functionally equivalent to hook and loop tape also allowed to be visible on the hard parts of the bumpers?

A: Please see [Team Update 12] (<https://firstfrc.blob.core.windows.net/frc2023/Manual/TeamUpdates/TeamUpdate12.pdf>). If that doesn't answer your question, please rephrase and resubmit.

(Asked by **2823** answered Feb 17th 23)

Q181 Old Cim motor housings as ballast holders

Q: RE: R502. We are wanting to use old CIM motor housings as easily mountable ballast containers. This is "modifying a motor", but having done so it is no longer a motor. Would that be allowed since the only part of the motor left would be the housing and it would not be acting as a motor?

A: This is considered modifying a motor and thus illegal per !R502.

(Asked by **3753** answered Feb 15th 23)

Q182 R611 Frame Resistance Check Value

Q: R611 and the inspection checklist show a resistance check value of 120 ohm. This is significantly lower than last years 3000 ohm value and may not provide an adequate check for frame electrical isolation. Is the 120 ohm value correct?

A: Yes, Compliance with !R611 is checked by observing a $>120\Omega$ resistance between either the (+) or (-) post within the APP connector that is attached to the PDP/PDH and any point on the ROBOT. Teams can view the [Electrical Inspection Video](<https://www.youtube.com/watch?v=KtPGO11VGIU&list=PLZT9pIgNOV6bjvvTgTTX3B4vGuJk1DsJs&index=3>) for an overview of how this is checked at an event.

(Asked by **5472** answered Feb 15th 23)

Q183 Magenta Light Fill and COOPERTITION BONUS

Q: Hi HQ, we had a question about the light strings. We understand that if 4 LINKS are scored with the COOPERTITION BONUS, that the middle DRIVER STATION has magenta lights with white in the middle (as shown as an example in the manual). We were wondering if after this happens, another LINK is scored (5 LINKS) if the middle DRIVER STATION's lights change from magenta to the ALLIANCE color since the COOPERTITION BONUS no longer becomes relevant or if the lights stay magenta.

A: The lights will stay showing the COOPERTITION BONUS, as shown in Figure 5-25, regardless of additional LINKS scored.

(Asked by **5347** answered Feb 15th 23)

Q184 Motors as ballast, Q181, R502, and R503

Q: Hello, in regards to the recent answer to Q181. If legal motors that aren't being used as motors can not be modified because of R502, does that also mean that any legal motor on a robot "must be controlled by a power regulating device" as stated in R503. Would this prevent teams from passing inspection if they had any disconnected legal motors on their robot?

A: There are no rules that require motors be powered.

(Asked by **3847** answered Feb 16th 23)

Q185 Solenoid question

Q: Is the exhaust port on a pneumatic solenoid considered an output? Ref R814 *Don't connect solenoid outputs together. The outputs from multiple solenoid valves must not be plumbed together.

A: A port that exhausts to atmosphere is not considered an output of the valve.

(Asked by **1512** answered Feb 17th 23)

Q186 How can a motor manufacturer apply to be able to become legal in FRC?

Q: If a motor manufacturer wants its motors to be legal in FRC, what requirements and/or application process should it go through?

A: The scope of this Q&A system includes and is limited to team questions about the [Game Manual] (<https://firstfrc.blob.core.windows.net/frc2023/Manual/2023FRCGameManual.pdf>), [Awards] (<https://www.firstinspires.org/robotics/frc/awards>), [Self-Inspection Checklist] (<https://firstfrc.blob.core.windows.net/frc2022/Manual/2022-inspection-checklist.pdf>), [official Field drawings] (<https://www.firstinspires.org/robotics/frc/playing-field#FIRSTDrawings>), and/or [Event Rules] (<https://www.firstinspires.org/sites/default/files/uploads/frc/EventRulesManual.pdf>) are posted to the Q&A System (for questions about other topics, please contact Team Support at firstroboticscompetition@firstinspires.org)(<mailto:firstroboticscompetition@firstinspires.org>).

(Asked by **6907** answered Feb 16th 23)

Q187 Using motors not listed in R501 not as an actuator

Q: Thank you for your answer to Q184. Following up further in the answer to Q181. May a team use a motor/actuator not listed in R501 or parts of an actuator not listed in R501 on their robot such that it is never powered in anyway. For example, using a motor casing (of a motor not listed in R501) to hold ballast without any of the electrical components of the motor included on the robot. Thank you, Spectrum

A: !R501 does not include exceptions for motors used in non-standard ways.

(Asked by **3847** answered Feb 17th 23)

Q188 Is PARKING counted for a static ROBOT?

Q: Are ROBOTS eligible for PARKING points even if they have not left their COMMUNITY at all during the MATCH?

A: Yes.

(Asked by **5347** answered Feb 17th 23)

Q190 Carts with or without robots

Q: Rule E602 requires that carts be able to fit through a standard 30-inch door. When a cart is less than 30 inches wide is carrying a robot that, with bumpers, exceeds 30 inches, is this rule violated?

A: No. Teams are encouraged to consider how they will move their ROBOTS from the Pits to the ARENA at their events.

(Asked by **5607** answered Feb 20th 23)

Q191 COOPERTITION BONUS Criteria Light Stings

Q: Hi HQ, we had another quick question about the DRIVER STATION lights. We noticed that on the Audience Display, a symbol for the COOPERTITION BONUS appears for an ALLIANCE when only they have scored three GAME PIECES in the CO-OP GRID regardless of the state of the opposing CO-OP GRID. Does this hold true for the magenta light pattern? Do do middle DRIVER STATION lights switch to magenta when the ALLIANCE has scored 3 GAME PIECES in their CO-OP GRID, or only when both ALLIANCES have done so?

A: The DRIVER STATION lights switch to magenta when the COOPERTITION BONUS criteria has been met, i.e. at least 3 GAME PIECES are scored on each ALLIANCE'S CO-OP GRID.

(Asked by **5347** answered Feb 20th 23)

Q193 R408 BUMPER attachment brackets between BUMPER segments

Q: In order to provide greater rigidity to a BUMPER, may metal brackets (pursuant to R408-F and R408-B) be used to extend horizontally across a gap between BUMPER segments on one side of a ROBOT? Figure 9-6 provides corner examples but R408-F provides no maximum distance between BUMPER segments.

A: No, as this would not be compliant with Figure 9-7.

(Asked by **360** answered Feb 20th 23)

Q195 Compressor

Q: Can we still use the Thomas compressor this year that we have used for many years?

A: Any compressor compliant with !R806 may be used.

(Asked by **1512** answered Feb 20th 23)

Q196 Attaching bumper plywood pieces to each other at the corners.

Q: To assemble the corners of the bumpers, we wanted to slip piece of 1" U-channel over one end the of the pieces of plywood to keep it from splitting as we drive screws into the end of it. This would only be on one piece of the plywood. This allows us to drive screws through the flat side of one piece (how screws are supposed to go through plywood and into the end of the second piece (with the 1" u-channel) to keep the second piece from separating the layers of plywood.

A: We cannot comment on part/design legality, previous calls of Head REFEREES or LRIs, or questions that are overly broad, vague, and/or include no rule references. Please consult [Section 1.10] (<https://firstfrc.blob.core.windows.net/frc2023/Manual/2023FRCGameManual.pdf>) and, if needed, resubmit a different question.

(Asked by **4534** answered Feb 20th 23)

Q197 R624 and multi-conductor sheathed cable

Q: a) Does multi-conductor cable with an outer sheathing that is not a color permitted in R624 fit the requirements for R624 if the individual conductors' insulation is of a legal color? b) Is there any requirement that the inner conductors' insulation be visible?

A: A) Yes. B) Yes, the color must be visible on both ends of the connection as part of the Inspection process.

(Asked by **1018** answered Feb 22nd 23)

Q198 G201 Clearly aimed strategies and defining standard gameplay

Q: What guidance does FIRST provide to head referees for identifying “clearly aimed” strategies? Is trying to prevent an opposing robot from reaching their COMMUNITY a strategy consistent with standard gameplay according to G201? Similarly, if a single defending robot’s strategy is to park adjacent to the opposing alliance COMMUNITY is the the opposing alliance robot required to avoid forcing a G207 when they attempt to enter their COMMUNITY to not be considered for a G201 themselves?

A: Generally, a ROBOT trying to reach its COMMUNITY or LOADING ZONE and accidentally moving an opponent ROBOT into that zone is not considered a "strategy clearly aimed at forcing the opponent ALLIANCE to violate a rule." On the other end of the spectrum, pushing an opponent ROBOT the length of the FIELD and into a protected zone, then blocking that ROBOT from leaving, would likely be considered a violation of G201. We cannot comment absolutely on hypothetical scenarios. The ultimate decision would be determined by the REFEREES at your event, with the final call made by the Head REFEREE.

(Asked by **6364** answered Feb 22nd 23)

Q199 Will teams be required to leave the field during awards ceremonies?

Q: Expanding on Q147. During the 8 minute break and 15 minute awards break specified in Table 11-3 (section 11.7.2) are teams allowed to be on the field? This is mostly important during Finals - Match 14, 15, and 16. Typically teams that don't need to do significant repairs to their robots keep them on the field and do minor checks/battery changes in preparation for the next match. But, since awards are being presented, will teams be required to leave the field?

A: The DRIVE TEAM and pit crew members may not stay on the FIELD during the breaks, but they can leave their ROBOT out of the way (e.g. up against the GRID) if repairs or service are not needed.

(Asked by **614** answered Feb 22nd 23)

Q200 Use of IP Based Devices Connected to Robot Through Driver Station via Windows ICS

Q: R903 specifies that the OPERATOR CONSOLE must be connected directly to the FMS and the use of a physical Ethernet switch between the OPERATOR CONSOLE and FMS is not allowed. Is the use of Window's ICS to pass network traffic from a secondary NIC to the primary NIC that is connected to FMS possible, allowing a separate IP based device to talk to the robot via FMS's network. Example: A custom IP based controller connected to the console via a secondary NIC to send IP commands to the robot.

A: No

(Asked by **836** answered Feb 23rd 23)

Q202 HYBRID NODE GAME PIECES angled outside of the GRID

Q: Hi HQ, we wanted to confirm our interpretation of how GAME PIECES are scored in HYBRID NODES. Because the front of the tape defines the front plane of a GRID, it is our interpretation that if a GAME PIECE is only contacting/supported by the carpeted area in a HYBRID NODE, but is angled such that part of the body of the GAME PIECE lies above the floor when past the tape, it is therefore out of the GRIDS and not considered scored. Is this interpretation correct?

A: Yes

(Asked by **5347** answered Feb 23rd 23)

Q203 G201 further description of standard gameplay

Q: Can the component actions of Q198's bookend examples (ie. forcing a G207 without intent, and pushing + trapping) be further clarified? Is a robot required by G201 to avoid/minimize contact when approaching their protected zone to collect or score a game piece or can they elect to take the shortest path when an opposing robot is intentionally occupying that path? Is forcing an opposing robot the full length of the field, forcing a G207, and then immediately disengaging a likely G201?

A: We cannot comment absolutely on hypothetical scenarios. The ultimate decision regarding if the strategy was to cause the opponent to incur a FOUL or not is determined by the REFEREES at the event (who have greater context), with the final call made by the Head REFEREE. Please see !G201 as updated in [Team Update 15] (<https://firstfrc.blob.core.windows.net/frc2023/Manual/TeamUpdates/TeamUpdate15.pdf>) for more clarification of strategies consistent with standard gameplay.

(Asked by **6364** answered Mar 1st 23)

Q204 Further clarification on G207 and Q198

Q: If a ROBOT pushes an opponent ROBOT the length of the FIELD and into a protected zone, then immediately backs away and permits the opponent ROBOT to leave, would that likely be a violation of G201? If not, would it be likely to have a G207 penalty assessed on the opponent ROBOT? In general, if there is contact between opposing ROBOTS while one robot is in their opponent's protected zone, must either G201 or G207 be called, or is there the possibility of no call?

A: We cannot comment absolutely on hypothetical scenarios. The ultimate decision regarding if the strategy was to cause the opponent to incur a FOUL or not is determined by the REFEREES at the event (who have greater context), with the final call made by the Head REFEREE. Please see !G201 as updated in [Team Update 15] (<https://firstfrc.blob.core.windows.net/frc2023/Manual/TeamUpdates/TeamUpdate15.pdf>) for more clarification of strategies consistent with standard gameplay.

(Asked by 112 answered Mar 1st 23)

Q205 Further clarification on G201 and Q198

Q: If ROBOT A is trying to reach its protected zone while being blocked by opponent ROBOT B just outside the protected zone and there is an alternate route around B to access the protected zone, is A obligated to take the alternate route rather than risk a G201 foul by moving B into A's protected zone? Is there any guidance to referees on differentiating between A accidentally and intentionally pushing B into A's protected zone when A is trying to access said zone?

A: We cannot comment absolutely on hypothetical scenarios. The ultimate decision regarding if the strategy was to cause the opponent to incur a FOUL or not is determined by the REFEREES at the event (who have greater context), with the final call made by the Head REFEREE. Please see !G201 as updated in [Team Update 15] (<https://firstfrc.blob.core.windows.net/frc2023/Manual/TeamUpdates/TeamUpdate15.pdf>) for more clarification of strategies consistent with standard gameplay.

(Asked by 112 answered Mar 1st 23)

Q206 R401 Corner needs bumper but not necessarily on the FRAME PERIMETER

Q: R401 Defines adequate protection 6" of bumper on each side of the corner, but it does not say that the 6" has to be on the FRAME PERIMETER, only on each side of the corner. The second image in Figure 9-3 shows not ok on a corner so the question is, if a 6" bumper piece was added that follows the FRAME down, not the FRAME PERIMETER then would the R401 be satisfied according to the robot in the image Assuming all other rules were in compliance

A: Per !R401, BUMPERS must protect all outside corners of the FRAME PERIMETER. A BUMPER segment that extends inside the FRAME PERIMETER is not considered a BUMPER per the top image in Figure 9-3 and would not satisfy the requirement of !R401.

(Asked by 4946 answered Feb 25th 23)

Q207 Replacement of RSL terminal block with spring clamp version

Q: Would replacement of the the user-removable terminal block on the RSL with an otherwise functionally identical terminal block, with spring clamp terminals instead of screw terminals, be an allowed modification to

the RSL per R710? (The specific part in question is Phoenix Contact P/N 1110582, <https://www.mouser.com/ProductDetail/651-1110582>)

A: *(edited Feb 28, 2023)* ~~No~~ **Yes**, the replacement does ~~not~~ fall under the exceptions of !R710 **as of [Team Update 15]
(<https://firstfrc.blob.core.windows.net/frc2023/Manual/TeamUpdates/TeamUpdate15.pdf>)**.

(Asked by **1018** answered Feb 24th 23)

Q208 Are nonfunctional decorative part created prior to kickoff allowed?

Q: Can a part that is purely decorative (eg a polycarbonate sponsor panel cut into the shape of a shark fin) that was created prior to kickoff be used on this year's robot? Such a part appears to count as a FABRICATED ITEM. However, it is not clear whether cutting a COTS part into a non-functional decorative shape counts as "non-functional decoration" of the COTS part (R302Ea) and we are not confident it could be accomplished within the 30 minutes specified in R302Ec.

A: This would be considered a "non-functional decoration" and legal per !R302Ea

(Asked by **199** answered Feb 25th 23)

Q209 R505, Connecting PWM to the RoboRIO

Q: Servos must be connected to PWM ports on the roboRIO, Spartan Sensor Board, or Servo Power Module. Is it legal to use a custom PCB that connects to the roboRIO such that the PCB is acting as essentially a wire between the roboRIO pins and the servo with no active or passive components?

A: Placing any PASSIVE CONDUCTOR(S) between the servo and roboRIO still complies with !R505.

(Asked by **118** answered Feb 25th 23)

Q210 Replacement of roboRIO power input terminal block with spring clamp version

Q: The answer to Q207 states that replacement of the user-removable terminal block on the RSL with a spring clamp version does not fall under the exceptions of R710. a) Would replacement of the user-removable roboRIO power input terminal block with an otherwise identical spring clamp version of the terminal block (AndyMark p/n am-2076a) be considered an allowed modification to the roboRIO under R710? b) if so, which exception does it fall under?

A: Please see [Team Update 15]
(<https://firstfrc.blob.core.windows.net/frc2023/Manual/TeamUpdates/TeamUpdate15.pdf>). If that doesn't answer your question, please rephrase and resubmit.

(Asked by **1018** answered Mar 1st 23)

Q211 Bumper Mounting to Frame Perimeter

Q: In a situation where a robot has two levels of frame that exist within the bumper zone, which are parallel but different perimeters (e.g. a larger "lower frame", and a smaller "upper frame", which is attached to the lower frame, in a higher part of the bumper zone, and when viewed from the top is fully contained inside the lower frame), would it be legal for bumpers to be attached to the inner frame, and backed by the outer frame, or must bumpers be attached to the outermost frame perimeter?

A: The FRAME PERIMETER would be defined by the larger ROBOT structure. Per !R408-G, the BUMPER must attach to the FRAME PERIMETER.

(Asked by **1405** answered Feb 27th 23)

Q212 R814 Solenoids plumbed in series legal?

Q: R814 states "outputs from multiple solenoid valves must not be plumbed together." This clearly makes plumbing solenoids in parallel illegal. Can you plumb the input of one solenoid to the output of another? Can you plumb two solenoids in series or is that in violation of this rule?

A: Plumbing the output or vent of one solenoid to the input of another is not a violation of !R814.

(Asked by **555** answered Feb 27th 23)

Q213 I103 Components During Inspection

Q: I103 states that "...all MECHANISMS (including all COMPONENTS of each MECHANISM), configurations, and decorations that will be used on the ROBOT in MATCHES without reinspection (per I104) may not exceed 150 lbs. (note that while up to 150 lbs of ROBOT MECHANISMS may be inspected together, the ROBOT configuration used in a MATCH may not violate R103)." Are all COMPONENTS as long as they are not a MECHANISM required to be weighed or not?

A: Individual COMPONENTS that are planned to be used as replacement COMPONENTS (e.g. a spare motor) and that not part of a MECHANISM that will be used on the ROBOT in MATCHES do not need to be included in the weight per !I103.

(Asked by **4786** answered Feb 27th 23)

Q214 Community Zone exception to G103

Q: Rule R402 states that the bumpers have to stay within the bumper area when translated to the flat floor plane. However, the game manual for the FRC Game Deep Space, in 2019, has an elaboration G23 that makes an exception for the same rule if the robot is entirely located within the hab zone. Will there be any exceptions to G103 within the community zone, which already allows for an extension of mechanisms in multiple directions outside the frame perimeter?

A: No

(Asked by **2438** answered Feb 27th 23)

Q215 Repairing Damaged Signal Light

Q: Hi FIRST HQ and GDC, We lost the connector for our RSL. Looking through the TE Connectivity FIRST Catalog for 2023 (<https://www.te.com/content/dam/te-com/documents/about-te/corporate->

responsibility/global/TEConnectivityFIRSTCatalog2023.pdf) we were excited to see a compatible spring terminal replacement and used our KOP voucher to order one and repair our nonfunctional light. Is this repair legal per R710M? If not could you point us towards a legal option for replacing our lost RSL connector?

A: Please see [Team Update 15]

(<https://firstfrc.blob.core.windows.net/frc2023/Manual/TeamUpdates/TeamUpdate15.pdf>). If that doesn't answer your question, please rephrase and resubmit.

(Asked by **401** answered Mar 1st 23)

Q216 Inter-Alliance scoring agreement

Q: If each alliance makes an agreement to pick-up 3 GAME PIECES from their SUBSTATIONS and drop them to the opponent's COMMUNITY, allowing each alliance to score a LINK on their CO-OP GRIDS and quickly achieve a COOPERTITION BONUS, what is the correct call?

A: The teams on the ALLIANCES are encouraging/being encouraged to play beneath their abilities and are thus violating !H105 and !H106. A team that has agreed to help opponents score is playing beneath their ability and in violation of !H106.

(Asked by **99999** answered Mar 1st 23)

Q217 Tolerance on Pool Noodle Size during Inspection

Q: We are having a tough time finding pool noodles that match the specifications for this year... Everything sold in stores locally right now measures close to the bottom end of the tolerance listed in R408C (2.25 inches). Since we will (unfortunately, despite our best efforts) be running against the line of what's legal, what can we expect inspectors to request to prove our legality? How can we prove that the noodles were "sold as" 2.5-inch? Should we pack a spare noodle to show to inspectors?

A: Any documentation that states the sold diameter of the pool noodle as 2.5" (including but not limited to a receipt, or picture of a box) or an example pool noodle for measurement if it's within tolerance would be sufficient

(Asked by **1902** answered Mar 1st 23)

Q218 Double Substation Shelf

Q: Before a match, can the human player move the double substation shelf to a position of our choosing, or does it have a dedicated starting location?

A: There is no dedicated starting location for the DOUBLE SUBSTATION shelf.

(Asked by **2832** answered Mar 1st 23)

Q219 Clarification of application of G201

Q: If one robot, who does not have a game piece, pushes an opposing robot into the pushing robot's protected zone from a distance of more than 4 feet. Does this violate G201?

A: We cannot comment absolutely on hypothetical scenarios. The ultimate decision regarding if the strategy was

to cause the opponent to incur a FOUL or not is determined by the REFEREES at the event (who have greater context), with the final call made by the Head REFEREE. There is no requirement that a ROBOT is or is not possessing a GAME PIECE for !G201 to be called. Various factors are assessed as context to determine if the referee perceives the interaction to be a strategy clearly aimed at forcing an opponent to violate a rule.

(Asked by **1729** answered Mar 1st 23)

Q220 Removing Robots from the Charge Station per H109

Q: Hi HQ, we had a clarifying question regarding rule H109. We understand that we are prohibited from climbing on the Charge Station (without permission). When removing Robots from the Charge Station, are we allowed to step partially or put weight on one of the ramps of the Charge Station to help remove our Robot from the Charge Station? Would this action count as climbing on the Charge Station?

A: Partially stepping on or putting weight on the CHARGE STATION is considered climbing on the CHARGE STATION per !H109. Please coordinate with FIELD staff on the safest way to remove the ROBOT from the CHARGE STATION. If the FIELD staff determine the safest method for removal is a DRIVE TEAM member tilting the CHARGE STATION, and this is communicated to DRIVE TEAMS, this would count as being instructed by FIELD staff to "climb on" the CHARGE STATION and not a violation of !H109.

(Asked by **5347** answered Mar 7th 23)

Q221 G301 and Cone Nodes

Q: The cone nodes are topped with a black plastic cap which is held in place by friction. Does causing this cap to come off, if done without grabbing or grasping the cap, constitute a G301 foul? Can a robot grab or grasp an object without positively retaining it? (e.g. if the object doesn't move with the robot)

A: Yes. Yes.

(Asked by **5987** answered Mar 7th 23)

Q222 Are you allowed to put a pin in the Robot to keep it steady while moving it onto the Field

Q: Are you allowed to put a pin on the robot to keep it steady as the robot's arm is too heavy to hold up while the robot is off. Then remove it when it's on the Field and turning on the robot and getting into Starting Configuration?

A: As long as the device does not cause delays per !H301, there are no rules prohibiting this.

(Asked by **4450** answered Mar 6th 23)

Q223 Can put cone upside down on the ground during auto field set ?

Q: Can put cone upside down on the ground during auto field set ?

A: Please see !Q33 and note that per !H301, the positioning of the GAME PIECES may not cause a delay to the start of a MATCH.

(Asked by 7522 answered Mar 6th 23)

Q224 G205 - Mutual bumper contact disabling robot

Q: With respect to Rule G205, if MUTUAL unintentional (non-deliberate) contact between robot bumpers results in electrical or mechanical damages leading to one robot to be disabled/undriveable, does that result in tech foul and red card for the still mobile robot? And if the contact was mutually initiated between bumpers resulting in either electrical or mechanical damage to BOTH robots drivetrain, is that grounds for a tech foul and red card for both robots?

A: Contact that occurs exclusively between BUMPERS (therefore not meeting the criteria of !G205-B) that is not perceived by a referee to be deliberately damaging (therefore not meeting the criteria of !G205-A) is not a violation of !G205.

(Asked by 3176 answered Mar 7th 23)

Q225 Can the Coach Use a Tablet For Strategy During the Match

Q: A device such as a tablet that is Capable of wireless communication but the team has made it so that it is no longer ENABLED, (turning off wireless and Bluetooth etc. through software) can this device be used for planning / tracking during the match by the coach. Does H303 part V "enabled" mean a device that's capable or just one where those features are on

A: If the device has the wireless capabilities disabled, it meets the requirement V of !H303.

(Asked by 4946 answered Mar 7th 23)

Q227 Notched Bumpers

Q: If a team has continuous bumpers all the way around their robot which are 5 inches tall when laying on the floor, constructed from ¾" birch plywood, and wishes to cut two notches along the top of the wood that are 1" deep and 4 to 6 inches wide each, both on the front side only, to allow the arm to go below the top of the bumpers, and not below the top of the frame perimeter, is this allowed? The bumpers would be securely mounted 7 inches above the floor when on the robot.

A: No, the described notches do not meet any of the exception criteria listed in !R408-A.

(Asked by 2640 answered Mar 9th 23)

Q228 May a team use REV Robotics Core Hex Motor on the 2023 bot? p/n REV-41-1300

Q: <https://www.revrobotics.com/rev-41-1300/> Team 6854 would like to use this lightweight motor. May we use this motor?

A: We cannot comment on part/design legality, previous calls of Head REFEREES or LRIs, or questions that are overly broad, vague, and/or include no rule references. Please consult [Section 1.10] (<https://firstfrc.blob.core.windows.net/frc2023/Manual/2023FRCGameManual.pdf>) and, if needed, resubmit a different question. The list of permitted motors is provided in !R501.

(Asked by **6854** answered Mar 9th 23)

Q229 can we use a commercial winch for our lift mechanism

Q: can we use a motorized commercial winch to lift our grabber

A: We cannot rule absolutely on hypothetical ROBOT designs, and the final decision as to legality of a particular ROBOT lies with the Lead ROBOT Inspector (LRI) at each event. The list of approved motors is in !R501.

(Asked by **4314** answered Mar 9th 23)

Q230 Using 6awg ring terminals to splice battery wires?

Q: Is it legal to use two 6AWG rated crimped on ring terminals (similar to andymark part am-4362) in order to lengthen the robot side battery cables? The ring terminals would be crimped on to the wires, and bolted together with a short bolt, washers and loctite blue, as well as being insulated with electrical tape.

A: No, this would not be compliant with !R609.

(Asked by **2733** answered Mar 9th 23)

Q232 Defensive strategy consistent with H107?

Q: Hi HQ, we had a question about rule H107. We understand that you may not sacrifice your RP for a Match to influence rankings. Does this rule extend to making it harder for the opposing Alliance to score bonus RP? For example, would unscoring one of your own Game Pieces in your Co-op Grid to nullify the Coopertition Bonus, thus making it harder for the opposing Alliance to achieve the Sustainability Bonus be considered against H107? Or would this fall under acceptable defense?

A: There are no rules that prohibit an ALLIANCE, of their own volition, from de-scoring GAME PIECES on their GRID, provided it's not an attempt to lose their MATCH or sacrifice Ranking Points. A team deliberately de-scoring GAME PIECES may be scrutinized in regards to !H106 and/or !H107.

(Asked by **5347** answered Mar 13th 23)

Q233 Can we use a monitor or tablet on our robot?

Q: Can we use a tablet or a monitor/display that provides video output from a Raspberry Pi to display our sponsors' logos on our robot?

A: We cannot rule absolutely on ROBOT parts, and the final decision as to legality of a particular ROBOT lies with the Lead ROBOT Inspector (LRI) at each event. If a rule seems ambiguous about if a particular device is legal or not, please rephrase and resubmit a question seeking clarity on the rule.

(Asked by **7439** answered Mar 13th 23)

Q234 I103 and identical MECHANISMS

Q: Do multiple identical MECHANISMS (as defined by I104E) need to comply with I103?

A: No, changes made to a ROBOT that comply with !I104-A through -E do not need all materials to have been presented for Inspection.

(Asked by **8513** answered Mar 13th 23)

Q235 R406a Clarification of "Font Element" & "GAP"

Q: R406a Blue Box "...Font elements less than ½ in. (~13 mm) such as serifs, rounded edges, small hairlines or gaps, etc. are permitted ..." Some fonts used by teams are solid white with "small gaps" in the font design. They are being asked to use paint or tape to fill in gaps. This makes a bumper look sloppy. What is the definition of a "font element" and "gap"? These are all cases where the team's numbers are unambiguous and meet the intent of the rule.

A: "Font elements" refer to the typeface, style, and size of the characters used and include the examples (serifs, rounded edges, small hairlines or gaps) listed in the Blue Box. Per the remainder of the Blue Box, these are legal if the majority of the stroke meets the sizing requirement and the numbers are unambiguous. The final determination of the ROBOTS legality, lies with the Lead ROBOT Inspector at each event.

(Asked by **6328** answered Mar 13th 23)

Q236 Can we use an LED system in our robot to enable communication between the driver and the h

Q: If the driver wants a cube, the robot will light up a purple LED, and if the driver wants a cone, the robot will light up a yellow LED. The human player will provide either a cube or a cone based on the driver's request.

A: There are no rules prohibiting the ROBOT from displaying information visually (e.g. by changing the colors of an LED) to any member of the DRIVE TEAM.

(Asked by **7439** answered Mar 13th 23)

Q237 Minor Protrusions outside the Frame Perimeter

Q: Are minor protrusions outside the vertical projection of the FRAME PERIMETER such as bolt heads, fastener ends, rivets, cable ties, etc only allowed inside the BUMPER ZONE, or anywhere vertically along that projection of the FRAME PERIMETER?

A: Minor protrusions inside the BUMPER ZONE are not considered part of the FRAME PERIMETER per !R101. Minor protrusions outside the vertical projection of the FRAME PERIMETER in STARTING CONFIGURATION are permitted per !R102.

(Asked by **930** answered Mar 15th 23)

Q238 Will the floor be completely straight and flat during competition?

Q: We noticed in our practice sessions that the pitch measured by our gyro changes by +-3 degrees since our floor isn't perfectly straight. In the FIELD, will you guarantee that the floor will not be elevated and be

completely flat, or should we consider that it will be off by a possible few degrees and that it may not be perfectly straight?

A: While every attempt is made to make the FIELD as flat and straight as possible, we cannot guarantee any specific tolerance due to the variability of flooring in different venues.

(Asked by 7576 answered Mar 15th 23)

Q239 G102 and Guardrails

Q: According to G102, contact with an object outside of the field is a violation and the offending robot is disabled. According to the definition of FIELD, the FIELD includes “the inward- and upward-facing surfaces of the guardrails”. Does a robot contacting the top of the field guardrail and exiting the field but touching nothing else constitute a G102 violation?

A: No, touching only the upward facing surface of the guardrail and nothing outside the FIELD is not a violation of !G102.

(Asked by 5987 answered Mar 15th 23)

Q240 Removing full compressed air tanks

Q: R806 requires all compressed air used in the robot to be provided by an onboard compressor. Is R086 violated by (a) temporarily connecting unpressurized air-storage tank(s) to the pneumatic system, (b) storing compressed air generated by the on-board compressors in the tank(s), (c) breaking the connection to the tank(s), (d) later, reattaching the tank(s) and using it/them to partially pressurize the system? In all cases, the external tanks would only be charged by the onboard compressor.

A: This does not violate !R806 but may violate !R807 if the tanks with compressed air are removed from the ROBOT. A completely isolated system is also a violation of !R813.

(Asked by 5607 answered Mar 15th 23)

Q241 Reflective signage

Q: Is signage or decorative materials with significant reflective or mirrored surface area allowed? Especially with regards to R203 and items a and c in the associated blue box.

A: There is no blanket prohibition against reflective or mirrored surfaces. A ROBOT may not have any features that employ reflective or mirrored surfaces in ways that violate rules (e.g. to obstruct or limit DRIVE TEAM members or designed to jam or interfere with remote sensing capabilities of other ROBOTS).

(Asked by 112 answered Mar 16th 23)

Q242 Bumper Fastening Distance

Q: R410 Requires bumpers be supported by structure/frame of the robot and that there can't be more than an 8in gap between backing. R408-G requires bumpers be attached with a rigid fastening system. Do these rules require bumpers to be fastened to the frame every 8 inches? If not, is there any rule that specifies how often the bumpers have to be fastened to the frame?

A: There is no explicit distance between fasteners or number of fasteners required so long as the BUMPERS "form a tight, robust connection to the main structure/frame" and the attachment system is "designed to withstand vigorous game play" per !R408-G.

(Asked by **4392** answered Mar 16th 23)

Q243 G205 Confirmation

Q: According to the blue box under G205, "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." Does this only give the Head Ref the ability to remove a G205 violation upon inspection after the match, or can a violation not called during the match be added afterwards based on inspection of the robots?

A: The Head REFEREE can make any adjustments needed to make sure that scoring and violation information was captured accurately after the MATCH.

(Asked by **5987** answered Mar 18th 23)

Q244 G206 & Intent

Q: G206 states "A ROBOT may not deliberately, as perceived by a REFEREE"... "tip"... Blue box example "c" makes no mention of intent as perceived by the REFEREE. Does example "c" also need to be deliberate as perceived by a REFEREE? For example, if a robot unintentionally, as perceived by a referee, and in course of normal robot to robot interaction causes an opponent robot to tip by contacting the opposing robot after it starts to tip. Is this still a violation of G206?

A: Yes, a REFEREE must have perceived the attaching, tipping, or entangling as a deliberate act in order for G206 to be violated.

(Asked by **2056** answered Mar 20th 23)

Q245 G206 & Avoiding Contact

Q: G206 Blue box states "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." How will refs determine if the "contact could have been avoided"? What responsibilities do each robot in this example have to avoid contact? Ex. A Red robot attempting to block the path of a Blue robot start to tip on its own. They collide and the red robot tips from the collision. What fouls would be called?

A: We cannot comment absolutely on hypothetical scenarios. The ultimate decision would be determined by the REFEREES at your event, with the final call made by the Head REFEREE.

(Asked by **2056** answered Mar 20th 23)

Q246 General ROBOT Design & G206

Q: "FIRST Robotics Competition can be a full-contact competition and may include rigorous game play." ... "teams should design their ROBOTS to be robust." This year's game challenge has many robots that can tip over from what would historically be considered normal robot to robot interaction. Given the severity of the penalty in the Playoff MATCHES for causing a robot to tip (Red Card), what responsibility lies with the TEAM

to ensure their robot is designed to be robust and resistant to tipping?

A: There are no minimal robustness specifications teams must meet to compete. A team deliberately designing or modifying their ROBOT to "draw" FOULS on an opponent via !G206 are employing strategy in violation of !G201.

(Asked by **2056** answered Mar 20th 23)

Q247 G201 + G206

Q: Will a robot with an intentionally very high COG, as perceived by a REFEREE, attempting to make contact with opposing robots be in violation of G201 for attempting to draw a G206? Ex. A blue robot positions its scoring mechanism or intentionally adds ballast very high up causing the robot to be unstable. That blue robot moves back and forth quickly attempting to block the path of red robots and the resulting contact causes blue to tip over. Is this a violation of G201 on blue? G206 on Red?

A: We cannot comment absolutely on hypothetical scenarios. The ultimate decision would be determined by the REFEREES at your event, with the final call made by the Head REFEREE.

(Asked by **2056** answered Mar 20th 23)

Q248 Order of operations for playoff points math at District Championships

Q: Hi HQ and GDC! Section 11.8.1 establishes that district points at DCMP are tripled, 11.8.1.3 that playoff points are determined by participation in alliance match wins but "If the result is not a whole number, the value is rounded up to the nearest integer." Can you clarify which operation will happen first, the tripling or the rounding up? Example: team plays in 1 of 3 wins, alliance loses in match 13 (13 DP): $\text{CEIL}(13 * 1/3) * 3 = 15$ points versus $\text{CEIL}(13 * 1/3 * 3) = 13$ points. Thanks!

A: The playoff points are rounded up and then tripled

(Asked by **401** answered Mar 23rd 23)

Q249 R303 violation penalty

Q: Greetings, R303 states that new designs and code must be made from scratch unless they were published prior to Kick Off. We have close relation with a team that developed a powerful drivetrain gearbox last season and wanted to use it for this one without publishing the design. We friendly tried to warn them but they didn't listen and they used the exact same mechanism, not even modified a bit. We consider this to be wrong and unethical. R303 doesn't state a penalty per violation, what'll happen?

A: The consequence to noncompliance with a ROBOT rule is an inability to pass inspection and compete in Qualification and Playoff MATCHES. If you have a concern to report, please connect with the LRI of the event.

(Asked by **9280** answered Mar 20th 23)

Q250 Tools allowed in the Pits

Q: Can an event decide which tools are allowed in the pits due to safety concerns even when those tools are specifically mentioned in the Pits section of the Event Rules and do not meet the qualification of being "too big"

as referenced in rule E505?

A: Yes, events may assess and restrict use of certain tools at an event due to reasonable safety concerns. If there's a specific concern about a specific event, please contact [firstroboticscompetition@firstinspires.org] (mailto:firstroboticscompetition@firstinspires.org) with details.

(Asked by **1746** answered Mar 23rd 23)

Q251 Cam we cower plexi with glass film

Q: Can we cover the plexiglass with window film in the section where we will display the stickers of our sponsors in our robot?

A: We cannot comment on part/design legality or questions that are overly broad, vague, and/or include no rule references. Please consult [Section 1.10] (<https://firstfrc.blob.core.windows.net/frc2023/Manual/2023FRCGameManual.pdf>) and, if needed, resubmit a different question.

(Asked by **7439** answered Mar 20th 23)

Q252 Platform for short driver

Q: One of our drivers is short and can't see the floor directly in front of the grid when standing at the driver's station. Can she stand on a 3 inch platform at the driver's station if we clear it with the head referee and the FTA prior to the start of the Regional? The alternative is that we fabricate some platform shoes or stilts for her.

A: The only items that may be brought to or used in the ALLIANCE AREA are listed in !H303. If a member of the DRIVE TEAM needs an accommodation to see from the DRIVER STATION, please talk with the FTA at your event and a ramp will be made available for them.

(Asked by **2194** answered Mar 20th 23)

Q253 G302 Charge Station Penalty = 3 Free Climbs?

Q: Hi HQ, we had a question about rule G302. We understand that if a Robot contacts their opponent's Charge Station in Auto, the opposing Alliance is considered to have a Docked and Engaged Robot for Auto. Based on our observation of many matches and many calls by Referees. It seems that this rule violation also gives the entire opposing Alliance Docked and Engaged points. We couldn't find any info regarding why this is occurring in the Manual, so we were wondering if we might be missing something?

A: No, violating !G302 does not automatically grant the opposing ALLIANCE three DOCKED and ENGAGED ROBOTS at the end of the MATCH.

(Asked by **5347** answered Mar 23rd 23)

Q254 R405.B, hook and loop locations?

Q: Based on the wording in R405 B, is hook and loop tape included on bumpers allowed to be anywhere on the bumper or just on the portions that are "backed by hard parts"? May red or blue hook and loop be backed by the fabric and pool noodle section of the bumpers? May hook and loop be used in the corner section of a bumper? Does this also apply to snaps? Are only functional equivalents restricted to hard parts or are hook and loop and

snaps also modified by that statement? Thank you.

A: !R405-B restricts all three items listed (if visible) to only areas of the BUMPER "backed by [...] hard parts".

(Asked by **3847** answered Mar 23rd 23)

Q255 Can team numbers wrap over the top edge of the bumper?

Q: With team numbers being a minimum of 4" tall, only part of the number will sit on the vertical portion of the cross section in figure 9-7. R406 has no requirement for the vertical spacing on the bumper, so can teams place their numbers such that they are offset towards the top? This means the number will wrap around the pool noodle, onto the top horizontal surface. This makes the number more easily readable than having part of it pointed downwards if the number is centered or below center.

A: There are no rules restricting the vertical BUMPER number positioning, provided (per !R406) "an observer walking around the perimeter of the ROBOT can unambiguously tell the team's number from any point of view."

(Asked by **2177** answered Mar 23rd 23)

Q256 Do H103 and H104 apply when braking the plane or making contact

Q: Do H103 and H104 apply when braking the plane or making contact with parts of the field/robots Eg. a team member points at a part of their robot from the side lines after a match but before the green lights, extending over the guard rail Please clarify what it means to "enter the FIELD"

A: The FIELD boundary is defined in Section 5.1. !H103 and !H104 are violated if anyone crosses over the FIELD boundary.

(Asked by **4946** answered Mar 23rd 23)

Q257 COTS Servo price limit

Q: R501 permits COTS servos with a retail cost up to \$75. Our team has an inventory of servos which met this requirement at the time they were purchased (2017), but are now retailing for more than the limit. Can these servos be used, or does the rule forbid previously legal components?

A: This price limit refers to the Fair Market Value (FMV) of the item, which is defined in the Blue Box of !R301 as "its price defined by a VENDOR for the part or an identical functional replacement. This price must be generally available to all FIRST Robotics Competition teams throughout the build and competition season." Thus, the FMV would be the current retail price.

(Asked by **3146** answered Mar 23rd 23)

Q258 Coaches and the Operator Console

Q: Per H501, coaches are not able to operate their team's robots. If the coach were to bring a wired device that communicates with the OPERATOR CONSOLE device but does not operate or control the robot (such as displaying an image on the device's screen), would this be legal under H501 and H303?

A: No, per the Blue Box below !H402: "For the purposes of FIRST Robotics Competition, any device connected to the Operator Console is considered a control device because Referees are not expected to differentiate between devices that can or cannot control the Robot."

(Asked by **3284** answered Mar 23rd 23)

Q259 Center Notch-out on fully supported bumper section

Q: If a bumper completely wraps around the robot frame perimeter and is mounted securely following all other sizing rules, Is it permissible to notch the center portion of the top of the bumper 10 inches wide and 1.5 inches lower on one side of the robot, leaving 9 inches of solid bumper from each corner and continuously across the bottom side of the frame? Example of this side of the side's bumper only with both ends securely fastened: -----
 _____/-----

A: We believe the answer to !Q227 addresses your question. If it does not, please re-phrase referencing specific rules and ask again.

(Asked by **379** answered Mar 27th 23)

Q260 No ROBOT "MATCH ready" then ROBOT?

Q: If a DRIVE TEAM member reports to the Head REFEREE that their ROBOT is not going to participate in a MATCH (and thus "MATCH ready" for the purposes of H301), can they change their status during a 2-minute window following a verbal warning issued to another team in the MATCH and compete with their ROBOT?

A: No.

(Asked by **99999** answered Mar 23rd 23)

Q261 Extension During Measurement Period

Q: Per T401, during the measurement period, can non-powered ROBOTS be manually extended outside their FRAME PERIMETER, while on the FIELD?

A: No.

(Asked by **3940** answered Mar 23rd 23)

Q262 Interaction with FIELD Elements for Measurement

Q: Per T401, during the measurement period, can humans dynamically interact with a SUBSTATION for the purpose of measurement?

A: Yes.

(Asked by **3940** answered Mar 23rd 23)

Q263 Measurement Device Interaction

Q: Per T401, during the measurement period, can objects used for measurement (eg. tape measures, or team supplied items that resemble, but do not meet the definition of, a GAME PIECE) interact with: A) a SUBSTATION? B) an un-powered ROBOT? C) an enabled ROBOT that has motion fully contained in its FRAME PERIMETER?

A: A) Yes. B) Yes. C) Yes. Note that per Section 11.4, the time is when "teams may survey and/or measure the Arena" and actions which do not appear to be measurement or surveying may be prohibited (e.g. a HUMAN PLAYER practicing entering GAME PIECES or a ROBOT launching GAME PIECES even while confined to its FRAME PERIMETER).

(Asked by **3940** answered Mar 24th 23)

Q264 R405 What is visible?

Q: Hi in your answer to Q254 you state that "R405-B restricts all three items listed (if visible)", does visible mean on top of the bumper fabric or is there some other way to define visible. Would color matched red or blue hook and loop be "visible" if it was on top of the bumper fabric? Thank you

A: "Visible" surfaces of the BUMPER are outward facing surfaces of the BUMPER not covered by another material. Color matched material would still be considered visible if on one of these surfaces.

(Asked by **3847** answered Mar 24th 23)

Q265 When does performance measurement (allowed) become practice (disallowed)

Q: Hello! If a team wishes to measure/survey the performance of the SUBSTATION during the measurement/calibration period (T401), how should they distinguish between "humans dynamically interact[ing] with a SUBSTATION for the purpose of measurement" (allowed per Q262) and "a HUMAN PLAYER practicing entering GAME PIECES" (disallowed per Q263)? Thanks for your clarification on this.

A: The distinction is not specified, and the final call is made by FIELD STAFF, typically the FIRST Technical Advisor, overseeing the measurement and calibration period. Generally, actions like moving the shelf of the DOUBLE SUBSTATION to a set position, then taking a measurement, would be allowed per !Q262. Quickly moving the shelf back and forth without stopping or pausing to take any measurements would be considered practice and not allowed per !Q263.

(Asked by **2363** answered Mar 29th 23)

Q266 Can getting disabled due to damage draw a G205

Q: If a red robot initiates contact inside a blue robot's frame perimeter and causes damage which removes the blue robot's bumper causing them to get disabled, would the G205 escalate to a red card as the blue robot was unable to drive due to being disabled? Similarly, if red robot initiates contact onto a blue robot which causes the blue robot to contact something outside of the field, and the blue robot gets disabled, is that a G205 and red card on red?

A: Initiating damaging contact inside the opponent's FRAME PERIMETER is a violation of !G205-B (provided the exception does not apply). If the damage directly results in a BUMPER being removed and the ROBOT is disabled, the violation would escalate to a RED CARD as the impacted robot is unable to drive as a result of the incident. Contact which results in an opponent ROBOT being disabled per !G102 would be scrutinized under

!G205. We cannot comment absolutely on hypothetical scenarios. The ultimate decision would be determined by the REFEREES as your event, with the final call made by the Head REFEREE. If the initiating ROBOT is perceived to be deliberately causing the contacted ROBOT to contact something outside the FIELD and be disabled, as perceived by a REFEREE, !G205-A may apply. If the contact is inside of the FRAME PERIMETER and directly results in the contact ROBOT extending outside the FIELD, !G205-B may apply. Interactions which do not trigger the initial violation of !G205 do not escalate to a RED CARD via !G205.

(Asked by **8513** answered Mar 31st 23)

Q267 Does the R904B exception for DRIVERS also apply to HUMAN PLAYERS?

Q: H402, H501, and the definition of OPERATOR CONSOLE all imply that HUMAN PLAYERS are permitted to control the ROBOT via a control device connected to the OPERATOR CONSOLE, provided that HUMAN PLAYER is present in the DRIVER STATION. However, most handheld wired control devices (like an Xbox style controller) do not fit within the OPERATOR CONSOLE size restrictions and require the R904B exception for use by a DRIVER during a MATCH. Does the R904B exception for DRIVERS also apply to HUMAN PLAYERS?

A: Per Table 6-5, a STUDENT who is operating or controlling the ROBOT is a DRIVER.

(Asked by **246** answered Mar 29th 23)

Q268 Game pieces under the single substation

Q: Would it be a violation of G402 (or any other rule) for the human player to take a cube or a cone and place it centered under the ramp of the single substation (not inside the field but just outside the field boundary directly under the ramp of the single substation) where a robot can use its vision system to detect the cone or cube through the clear polycarb and automatically align to the center of the substation for receiving a game piece?

A: There are no rules prohibiting this.

(Asked by **4678** answered Mar 29th 23)

Q269 Field Access Between Events

Q: Given that many venues host events multiple weeks where the field remains set up for a period of time between events, can teams use the event field before the event officially begins? This can provide a huge advantage to dialing in autonomous / calibrations before other teams have the opportunity to. E108 wouldn't apply here since calibration changes aren't fabricated items and R304 does not apply before the event starts. E107 may apply, but it is unclear when event rules become relevant.

A: No.

(Asked by **8096** answered Mar 29th 23)

Q270 11.2 Definition of event staff and what constitutes review of a match

Q: 11.2 states that under no circumstances will any event staff review video, photo, artistic renderings, etc. of any MATCH from any source. Who is included in event staff? For example, would an LRI not be able to review match video? Would a CSA or FTA not be able to review logs from a match?

A: Event staff includes all persons working in a paid or volunteer capacity to run the event, including the LRI. Data logs are not included in Section 11.2, and may be reviewed by the FTA or CSA to assist with ROBOT and FIELD troubleshooting.

(Asked by 27 answered Apr 3rd 23)

Q271 H102 backup drivebase

Q: We built a new drivebase for our next event. We would like to bring our old drivebase as a back up. To avoid violating H102, we would remove the wheels, gearboxes and chains from the old drivebase prior to the event (total weight of robot and spare drivebase frame is <150 lbs). Can we rebuild the backup drivebase during the event in case we need it?

A: Having a complete spare drive base, regardless of if it is build prior to or during the event, is a violation of H102.

(Asked by 2990 answered Apr 3rd 23)

Q272 CUSTOM CIRCUITS on Low-Current channels of PDH

Q: Can a CUSTOM CIRCUIT be connected to an otherwise-unused low current channel (i.e., ch 20, 21, or 22) of the REV PDH? (This is assuming that the fuse used is 15A or smaller and the fusing properly matches the wire gauge.)

A: Yes, those terminals are also "12VDC WAGO connector pair[s]" as described in R610.

(Asked by 695 answered Apr 5th 23)

Q273 Clarification on G301 blue box

Q: The blue box in G301 states "Gouging, popping, tearing off pieces, or routinely marking GAME PIECES are violations of this rule." Does the "routinely" apply to only marking or to gaging popping and tearing off as well. The root of the question being if you gouge pop or tear off a piece of a game piece only once, and not routinely, is it a violation of G301.

A: Any instance of gouging, popping, or tearing a piece from a GAME PIECE is damage and a violation of G301.

(Asked by 8513 answered Apr 3rd 23)

Q274 G203 Clarification: Major Elements of Match Play

Q: G203 clearly states that 2 or more ROBOTS may not work together to isolate or close off any major element of MATCH play, however "Major elements of MATCH play" is not a defined term in the official FRC glossary. Can you please confirm or deny if a single ROBOT is considered a "Major Element of MATCH Play", with the consequences then being that if a ROBOT is a "major element of MATCH play", that 2 ROBOTS may not simultaneously play defense on a single opponent ROBOT without violating G203.

A: Two ROBOTS defending an opponent ROBOT is not automatically a violation of !G203.

(Asked by **4476** answered Apr 3rd 23)

Q275 R408e: Clamping Cloth

Q: R408e states that bumpers may "optionally use metal angle, as shown in Figure 9-7 or other fasteners (e.g. staples, screws, adhesives, etc.) to clamp cloth. " It is not clear what would be considered a "fastener", although the use of the word "other" seems to suggest that metal angle itself is a fastener. Would other shapes of metal extrusion, for example metal plate, be a type of "fastener" allowed to be used to clamp cloth?

A: Yes, as long as the metal plate were used to clamp the cloth to the plywood in the same manner as the metal angle shown in Figure 9-7 and did not violate any other BUMPER rules (e.g. !R408-B).

(Asked by **971** answered Apr 5th 23)

Q276 Cube scoring if it's suspended solely by the high cone and high cube platform?

Q: Does a cube that is stuck between the cube platform and the high cone node such that it's completely suspended between them count as "partially or completely (regardless of inflation state) supported by a CUBE NODE."? What constitutes the cube node - the platform itself or the entire body (sides included)?

A: The CUBE NODE is the polycarbonate shelf that is 1 ft. 6¼ in. wide and 1 ft. 5 in. deep. The CUBE NODE does not include the 3 in. tall vertical walls. Thus, a CUBE that is suspended between a CONE NODE and the outside face of the polycarbonate side of the shelf is not touching the CUBE NODE and does not count as scored.

(Asked by **8085** answered Apr 5th 23)

Q278 R803. Pneumatics cylinder paint

Q: We powder coated our aluminum cylinder last season (donated by a sponsor). At our final competition this season (week five), several inspectors pointed out we were not allowed to have it painted, despite the robot passing inspection Week One and all last season. What is the clear definition so we can make sure the robot is within guidelines?

A: Per !R803, pneumatic COMPONENTS must be used in their original, unaltered condition. Painting a tank would be a violation of this rule.

(Asked by **7598** answered Apr 5th 23)

Q279 Vision Target Mimicry

Q: The answer to Q38 suggests that usage of other families of AprilTags and other fiducial targets are permitted as long as they do not resemble FIELD targets. a) since Q38 specifically refers to H303, does A38 also apply to the "mimicry" in the blue box for R203? b) if a team utilizes a fiducial target that DOES NOT resemble a FIELD target, but DOES (unintentionally) interfere with another team's robot (i.e. because that team is also using the same fiducial), does that violate R203 or H303?

A: As described in !R203-C, the "mimicry" only applies to the vision targets listed in Section 5.9 Vision Targets.

(Asked by **1018** answered Apr 6th 23)

Q280 Robot Signal Light Behavior

Q: R709 states that the robot must have a signal light connected to the proper terminals and that the RSL must be wired correctly per the diagram. Is there any requirement that the RSL behavior matches the typical "blinking: enabled/solid: disabled" behavior at inspection or during a match?

A: Yes. If the RSL is wired properly and functioning, it's behavior will be consistent across all ROBOTS.

(Asked by **1018** answered Apr 5th 23)

Q281 Operator Console securement to the DRIVER STATION support shelf

Q: Can the Operator Console be temporarily secured to the DRIVER STATION support shelf with a quick connect clamp, instead of the hook & loop?

A: No, per !R904, part D and !G301, part C.

(Asked by **4336** answered Apr 5th 23)

Q282 Pit Crew Limitations and Event Documentation

Q: Given the answer to Q157, how should teams approach a scenario where event staff restricts the ability for pit crew members to enter the queueing area? Specifically the document for FiM District Championship contradicts Q157. "Teams are allowed to bring 3 additional people and items from their pits out by their field after the completion of Round 3". This doc is linked at <https://firstinmichigan.us/FRC/state-championship/> under FIM-Specific Information.

A: If a team has a concern about processes, implementations, etc. at an event, we encourage them to bring to the attention of event management. If the issue requires further escalation, please contact *FIRST* at firstroboticscompetition@firstinspires.org(firstroboticscompetition@firstinspires.org).

(Asked by **8096** answered Apr 11th 23)

Q283 Clarification on a specific docking situation

Q: Red robot 1 is at one end of the charging station, with its wheels on the charging station AND part of the robot supported by the floor. Red robot 2 is fully supported by the charging station and touching red robot 1 and 3. Red robot 3 is dully supported by the charging station and only touching red robot 2. Can red robot 3 be docked if it's touching a robot which is not considered docked, but IS fully supported by the charging station.

A: Yes, Red ROBOT 3 would be considered DOCKED because the only things it is contacting are "the CHARGE STATION and/or other items also directly or transitively fully supported by the CHARGE STATION."

(Asked by **8513** answered Apr 10th 23)

Q284 Allowed to prop open single substation chute door?

Q: Are HUMAN PLAYERS allowed to use a GAME PIECE (e.g. a CONE) to prop open the chute door(flap) on the PORTAL of the SINGLE SUBSTATION? More specifically, can: 1. A CONE be used on top of the portal to hold open the chute door? 2. A CONE or CUBE be used inside the portal to hold open the chute door? If either or both of the above are NOT allowed, can you clarify which rule this would violate? In practice, this has been ruled inconsistently event to event. Clarification appreciated!

A: There are no rules preventing using a GAME PIECE to hold open the flap of the SINGLE SUBSTATION provided no other rules are broken.

(Asked by **2992** answered Apr 11th 23)

Q285 Packet capture software on Operator Console

Q: Is there any rule or guideline preventing a team from running packet capture/logging software (such as Wireshark/pktmon) on their Operator Console during a match?

A: While there are no rules prohibiting the use of packet capture software, any risk of additional latency or inability to connect to the ROBOT is assumed by the team.

(Asked by **1018** answered Apr 11th 23)

Q286 Clarification regarding Team Update 21

Q: If a ROBOT scores a CUBE into a HYBRID NODE during AUTONOMOUS and a second ROBOT also scores a CUBE into the same HYBRID NODE, and then later in the course of the MATCH the ALLIANCE completes all the GRIDS, is the second CUBE scored by the ALLIANCE counted as SUPERCHARGED immediately when the rest of the GRIDS are filled?

A: The assessment of GRID scoring does not rely on the order GAMEPIECES are placed in. Prior to the GRIDS being completed, a second GAMEPIECE placed in a NODE will not be scored. As soon as the GRIDS are complete, any NODES which contain 2 scored GAMEPIECES will be scored as SUPERCHARGED.

(Asked by **7576** answered Apr 11th 23)

Q287 Bumper Height

Q: R402 asserts that "BUMPERS do not have to be parallel to the floor", which seems to allow a segment of the BUMPER to be angled relative to the ground as long as all other BUMPER rules are met. For a BUMPER segment angled in this way, is the "5 in. \pm 1/2 in" wood backing height as prescribed by R408-A measured perpendicular to the bottom edge/face of the bumper or perpendicular to the ground plane?

A: The 5 in. +/- 1/2 in measurement should be made perpendicular to the bottom edge/face of the BUMPER.

(Asked by **971** answered Apr 12th 23)

Q288 Clarification regarding Team Update 21 Section 6.4.1

Q: If a CUBE or a CONE is partially inside the HYBRID NODE and is touching the carpet, will it be scored at the end of the match? If a CUBE or a CONE touching a scored CUBE or CONE in the HYBRID NODE will the NODE be SUPERCHARGED at the end of the match (if the GRID is full)?

A: Per Table 6-1, the GAME PIECE must be fully contained within the GRID to count as scored. A GAME PIECE that is partially out of the GRID does not count as scored regardless of what it is touching. If a GAME PIECE is fully contained within the GRID and only touching a GAME PIECE that is touching the FIELD carpet in 1 HYBRID NODE, the GAME PIECE counts as scored.

(Asked by **1574** answered Apr 12th 23)