2022-2023 FIRST® Tech Challenge

Forum Answered Questions

Traditional
How To Use This Document

The FIRST Tech Challenge Official Q&A Forum is a place where teams can ask questions and receive official answers from game expert moderators. The official FIRST Tech Challenge Question & Answer Forum rulings take precedence over all information in the game manuals.

Moderators will answer team questions beginning each Monday, and close on Thursday at 12:00pm eastern time. The forum answered questions are then converted to PDF (this document) to be easily read by teams and volunteers. This takes place every week for the entire season, so teams should ensure to access the new forum printout each Thursday. Any rule clarifications or changes will apply to events happening that weekend.
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Traditional and Remote - General Robot Rules

Q1 Will the T265 be legal again this year?

Q:
The T265 Intel camera has been legal in years past. We just want to make sure that it will still be legal this year.

A:
Depth/tracking cameras that do not include projected laser grid patterns and provide all data as video/image streams fit within the allowances of RE14.

The Intel T265 appears to meet these constraints.

(Asked by 12014 answer published at October 11th 2022)

Q2 Reuse previous year robot

Q:
May we reuse the previous years chassis if we replace previous years arm and element gripper?

A:
Yes, Teams may re-use any legal parts or assemblies from previous Robots.

(Asked by 17993 answer published at September 29th 2022)

Q57 Clarification Regarding RG07 Detached Robot Parts

Q:
According to rule RG07, a tethered part is considered detached and therefore illegal if "either is able to move independently of the other." What is the official ruling on what "move independently" means? If the detached element relies on the main robot for power and control signals, is it legal? If it's not legal, is there any way to make it meet the requirements in the spirit of the competition?

A:
A tethered part that relies on the main robot for power or control is considered to be detached and is not legal. We cannot speculate on possible designs that may or may not be legal.

(Asked by 14129 answer published at October 10th 2022)

Q114 Bungee cords legal?

Q:
Hello! We are using bungee cords with attached hooks to help provide counterbalance for the arms. My question is the bungee cords legal?

A:
Yes, bungee cords are legal.

(Asked by 12722 answer published at November 8th 2022)
Q132 Team Number Display on diagonal

Q:
Can the team number be placed on the robot at a diagonal? For instance. 1 8 8 3 8

A:
Yes, Team Numbers may be placed at an angle providing they are easily viewed and recognized by the Field Personnel.

(Asked by 18838 answer published at November 10th 2022)

Q140 Is leather a prohibited part?

Q:
Our team has a leather strap on the Cone manipulator system. We are wondering if this is an illegal part under Rule <RG01>, Item f.? Leather is an "animal-based material", but i our view does not fit the concern of having "health and safety concerns". Thank you. <RG01> Illegal Parts, Item f.: "Those that contain animal-based materials (because of health and safety concerns)."

A:
No, leather is not an allowed material.

(Asked by 21579 answer published at November 17th 2022)

Q144 Multiple grabbing mechanisms.

Q:
Our team has two interchangeable grabbing mechanisms. One is a regular claw and the other is a tension grabber that tightens around the cone. To clarify, only one grabber is or at a time and the other is used as a replacement backup if one breaks. My question is if we bring both grabbers to inspection would we be able to replace say the tension system with the claw in between matches? or would the entire robot need to be inspected again?

A:
Both configurations must be inspected. As long as the basic functionality of the robot has not changed, there is no need to be re-inspected if the grabber is changed. Remember that the limits on motors and servos will apply to the combined motors/servos of both grabbers and the base robot.

(Asked by 19591 answer published at November 17th 2022)

Q167 G14 and RG02 Clarification

Q:
RG02 and G14 seem to be conflicting in regard to robot starting size. G14 mentions volume, which we assume to mean that we can place the robot in a sizing box diagonally. RG02 specifically says that the robot has to be under 18x18x18 l*w*h. The diagonal of the 18x18 cross-section is around 25". Based off the wording of G14(Robot in its starting location must not exceed a volume of 18x18x18), we should be able to play with a robot that is 14"x22"x18 inches?

A:
The Robot must be inspected in the same self supporting orientation that it will start the Match in. The robot cannot rely on any object (sizing box, playing field wall, cone) to hold at an angled orientation. Without seeing the robot in question it is difficult to make a judgement but if the drive base of a Robot is 14" x 22" there is no orientation in which it will fit into an 18" x 18" area.

(Asked by 12051 answer published at November 20th 2022)

Q170 Q167 Clarification

Q:
Would a robot placed in a sizing tool as shown in this image: https://imgur.com/a/ItSnPdN be legal? The base is approximately 13"x13" with the slides in their fully-retracted position making the length of the robot around 20-22". The wheels are not touching the edges of the box, and the claw can also be assumed as such for the scenario. If the answer is different than that of Q167, how does this affect Q168?

A:
Yes, this is a legal Robot, assuming the gripper is not being held up by the sizing box.

(Asked by 12051 answer published at November 22nd 2022)

Q190 Team Number display on one platform

Q:
Is it legal to have the team number on opposite sides of the same structure? For example. If a team had a plate located in the center of the robot and the team numbers were on either side of that plate would that be allowed?

A:
Yes, provided that the Team numbers are easily readable (i.e., not obscured by other Robot parts).

Note: Keep in mind that rule RG05 states that the Alliance marker must be displayed on the same side of the Robot as the Team number, within a 3-inch distance of the Team number.

(Asked by 8899 answer published at November 29th 2022)
Q206 Title: Clarification on meaning of "Vacuum based mechanism"

Q: Would a suction cup count as "vacuum based mechanism", something that is simply activated like a bathtub or shower suction cup where you just stick it. Would adding a release valve make it fall under this category if it doesn't without one? This system would interact with the cone game scoring elements, and the suction generated only by pushing the cup against a cone, and not by using a cylinder to compress or suck air away. the release would be a mechanically controlled hole in a suction cup.

A: Teams may not use devices that create a vacuum. Suction cups, while being a very simple device, fall into that category and are therefore not legal. Adding a release valve does not change the legality.

(Asked by 16449 answer published at December 7th 2022)

Q224 RG05 Clarification

Q: Which way does the alliance marker have to be 3" from the team number? If the team number is on the outside of the robot and the bottom of the alliance marker is 1" above the top of the number, but the marker is near the center of the robot (4-6" away), is it still legal? Does the marker have to be within 3" vertical/horizontal or 3" vertical/horizontal and 3" deep?

A: The Alliance Marker should be roughly in the same plane as the Team number and no more than 3" away in the horizontal or vertical direction. A Marker 4" - 6" away would not be acceptable.

(Asked by 12051 answer published at December 14th 2022)

Q226 are we allowed to have red and blue on the robot?

Q: Our team is 3d printing some stuff and want to take the opportunity to create the American flag on the print. this would, of course, include having both red and blue on the part. We are printing a rather large part on the robot and are curious if we are allowed to have red and blue as part of the robot because those are the same colors as the alliance markers the idea is that the piece would be easily identifiable as the American flag and not an alliance marker but we are still curious.

A: Yes, it is quite common for robots to have large areas colored red, blue (or green, black, etc.). If you think it may be confusing to have a red alliance marker against a blue robot, you may want to consider adding a white patch on your robot that will outline the alliance marker, but this is not required.

(Asked by 19591 answer published at December 14th 2022)

Q231 Are LEDs Integral to Digital Sensors Allowed

Q: Per Q198 the light integral to the color sensor is "not constrained by RE13." Per Q191, the REV LED indicator is not allowed per RE13.d (presumably, drawing power from an unallowed source/DIO). Oher REV sensors powered by digital ports include LEDs that are integral to the sensor and not user manageable (the REV touch sensor and REV magnetic limit switch being two). Are these sensors allowed? If they are, is it under a similar logic to Q198 (LEDs integral to sensors are not constrained by RE13)?

A: Many sensors from many vendors have LEDs as standard parts of their functioning. These types LEDs are allowed in sensors as included by the manufacturer.

(Asked by 9205 answer published at December 13th 2022)

Q233 Does the team number need to be visible on both sides at all times?

Q: Do the team numbers need to remain visible on two sides (180 degrees apart) at all times during matches? A number is displayed on the arm, and when it moves, it turns, and the number moves with it and is no longer visible on the left side while the attachment is in use.

A: Yes, the number must be visible to field personnel during the entire Match.

(Asked by 19388 answer published at December 14th 2022)

Q252 Can goBilda 1x15A Motor Controller (30A Peak) be allowed in FTC competitions 2022-2023?

Q: Due to the shortage of REV Control Hub and Expansion Hub, we have to use a mini controller for the 5th DC motor for our slide, but REV SPARKmini Motor Controller is not available for weeks till this FTC season ends as confirmed by REV support, the only option left seems to be goBilda 1x15A Motor Controller (30A Peak) which is not listed <RE09 as legal, CAN FIRST ALLOW IT FOR THIS FTC SEASON BASED ON THE SPECIAL AND DIFFICULT DITUATION?!!

A: This has been addressed in Q5 (qa/5) and Q104 (qa/104)
Q265 Would like a clarification on use of a COTS flashlight. In regards to RE13.

Q:
We would like to use consumer COB work light as a light source. We would like to mask the light to shine a narrow headlight beam to help Drivers navigate the rows and columns. Since there are no lenses or mirrors, we are just masking the light, is this allowed?

A:
As long as the flashlight does not include any sort reflector or a focusing lens it would be allowed.

Be aware that most flashlights include a reflector (frequently parabolic) behind the light source to reflect/focus the illumination into a single direction.

(Asked by 12168 answer published at January 11th 2023)

Q282 Illuminated Alliance Markers and Team Numbers

Q:
May a light source be used to illuminate Alliance Markers or team numbers? For example: https://ironreignrobotics.org/ftcpanels/

A:
No. Team numbers and alliance markers need to be visible/legible regardless of the powered state of the robot.

(Asked by 14140 answer published at January 25th 2023)

Q291 Driver Station Disconnects From Robot

Q:
Hello! When I am driving my robot. If the robot hits a wall or a junction, it sometimes disconnects from the driver station. It moves around, following the gamepad's last action, until it disconnects. I checked the battery connections on my robot. What else can I do?

A:
The FTC Q&A forum is intended to answer questions about gameplay, competition rules, judging rules, robot build rules, field setup and team scoring element rules.

The FTC community forum is the best place to ask this particular question. The community forum topics include the official FIRST Tech Challenge Software Development Kit (SDK), programming your robot, using the Machine Learning Toolchain, etc.

You can access the FTC Community forum here: https://ftc-community.firstinspires.org/ (https://ftc-community.firstinspires.org/)

Teams can also access technical resources here: https://ftc-docs.firstinspires.org (https://ftc-docs.firstinspires.org)

(Asked by 22330 answer published at February 2nd 2023)

Q305 External battery at the drivers station due to replacment battery is out of stock

Q:
Is an external power source such as a rechargeable battery able to be used at the drivers station to keep the Rev Drivers Hub powered during a match? This is being asked because Rev's replacement battery has been out of stock for the season, and it is a specific battery design so it can not be purchased through other battery suppliers. This is the battery inside the Drivers Hub, not the robot power source.

A:
The answer you seek can be found in Game Manual Part 1, rule DS05. Basically, the answer is yes, you can have a battery connected to the Drivers Hub. See DS05 for the specifications.

(Asked by 13474 answer published at January 31st 2023)

Q306 Unpowered USB Hub and Control Hub

Q:
In <Q119> you clarify <RE14> applies to Control Hubs, then in <Q244>, you further clarify that <RE14> is a recommendation, not a requirement to pass inspection and compete. We wanted to make absolutely sure <Q244> also applies to <Q119>: is it legal to use a non-externally powered USB hub connected to a Control Hub, provided it doesn't cause any other issues?

A:
Yes, per RE15.c.ii - allows for either a powered or a non-powered USB hub

(Asked by 18438 answer published at February 1st 2023)

Q352 Clarification of Q282 - Illuminated Team Numbers and Alliance Markers

Q:
We are seeking clarification on the ruling for Q282. Does this ruling mean that - A. All Illuminated Alliance Markers or Team Numbers are illegal as their visibility becomes dependent on the powered state of the robot or, B. Illuminated Team Numbers or Alliance Markers may still be allowed so long as they are sufficiently visible when the robot is off.

Take for instance this backlit light configuration, https://imgur.com/n9tDlLP (when Powered off) https://imgur.com/RpfGLl1 (When Powered on)
A: The ruling from Q282 does not apply to the robot numbering scheme presented in these pictures. Q282 specifically addressed the use of LED panels as the sole means of communicating the team number and alliance marker.

(Asked by 18527 answer published at February 16th 2023)

Q367 Can you be more specific regarding placement of alliance marker "roughly in the same plane?"

A: Can you be more specific regarding placement of alliance marker "roughly in the same plane" (Q224 RG05)? Is this example alliance marker placement acceptable? https://imgur.com/tzIinek Markers are within 3" of team number, so specifically the question is about the "roughly in the same plane". Head Referees at last meet were divided on this. Thank you for the wonderful job you all are doing!

(Asked by 14295 answer published at March 1st 2023)

Traditional and Remote - Commercial Of The Shelf Components

Q5 Are motor controllers illegal?

A: Are motor controllers illegal? The REV control hub only has four ports to plug in a motor and to get more you need to purchase the REV expansion hub. However, the REV expansion hub is sold out for the season and I can't find a used one anywhere. I was wondering if it is legal to use a motor controller as an adaptor to change a servo port to a motor port.

(Asked by 19591 answer published at October 4th 2022)

Q19 Axon Robotics Codex Odometry Module legality

A: Is the Axon Robotics Codex Odometry pod legal according to the COTS rules? It is an odometry module sold without an encoder. Link is here: https://axon-robotics.com/products/codex-odo. The encoder is available here: https://axon-robotics.com/products/redux-encoder

(Asked by 365 answer published at September 29th 2022)

Q31 Reaffirmation of Intel D435 Distance Camera

A: We've been experimenting with the Intel D435 distance camera based on the answer to forum question Q293 "RE13 is specifically about light sources, not about sensors in general. The two cameras mentioned [D415 and D435] do not fall under the limitations applied to light sources." But now the answer to question 306 appears to reverse field, since it states "Due to the unknown aspects of laser light sources on the playing field, the laser prohibition in RE13 has, in general, been applied to all e

(Asked by 4348 answer published at October 11th 2022)

Q52 Are preassembled non-robotic slides allowed?

A: Can linear slides prepared for non-robotics applications be used like the ones we see used in previous years such as drawer slides?

(Asked by 12978 answer published at October 6th 2022)
Q53 GoBilda Parts and Kits

Q:
Are GoBilda parts and kits allowed for this year's game?

A:
Teams may acquire parts and materials from any readily available source, including GoBilda, providing they do not violate any robot build rules. Pay specific attention to Rules RM01 and RM02 when purchasing parts and kits.

(Asked by 19832 answer published at October 10th 2022)

Q63 Legality of D4O5

Q:
The Intel D405 camera does NOT infrared laser to project a grid of dots within the camera field of view (as per your response to "Q31 Reaffirmation of Intel D435 Distance Camera." I asked Intel Support and their official response to my question was as follows, and I quote, "The D405 camera model is not equipped with the Class 1 laser-based infrared projector that other 400 Series camera models (D415, D435, D435i, D435f, D455) have." Is the Intel D405 camera therefore legal? Thank

A:
Yes. As a depth camera without laser grid functionality, it is allowed as a video source.

(Asked by 10738 answer published at October 14th 2022)

Q99 Legality of Swerve Module Kits per <RM02>?

Q:
Rule <RM02> in game manual 1 states that "COTS drive chassis are allowed provided none of the individual parts violate any other rules." Do swerve module kits such as https://www.armabot.com/collections/motion-articulation/products/microswerve?variant=308941093930 fall under this umbrella? A) This kit has enough modules for a full robot, B) has no otherwise illegal components included in the kit, C) and can easily be adapted to use MATRIX motors with a single part.

A:
Swerve module kits are not legal COTS.

(Asked by 16379 answer published at November 1st 2022)

Q103 Parts from Vex-robotics not listed as "FTC allowed" or "illegal for FTC", can we use them?

Q:
This part...https://www.vexrobotics.com/276-7285.html (2x2x2x20 Aluminum U-Channel (6-pack). ) is an example that we are not sure if we can use on FTC robot. We cannot verify if it is allowed, nor if it is illegal. We also found that https://www.vexrobotics.com/217-7768.html. (FTC starter kit) is claimed on that web page as FTC legal, but not listed on FTC document as allowed. (nor as illegal) Please offer a clear answer.

A:
Q1: Rule RM01 allows for the use of readily available extrusions and post-processed materials. The Vex U-channel is such a material and is therefore legal.
Q2: The kit is legal but some of the parts, such as the traction wheels, may be subject to other rules (RG01a).

(Asked by 21852 answer published at November 3rd 2022)

Q107 Legality of Universal Joints

Q:
To ensure we don't run into any issues with our current claw, I wanted to check the legality of universal joints. All I could find on the topic was a Reddit post from 5 years ago where the answer was a resounding no, and an archived forum post from Ultimate goal where they were deemed legal. There are universal joints from gobilda I have seen other teams use, though we are currently using generic ones from amazon. (www.amazon.com/dp/B07WGD4ZR6) (www.gobilda.com/universal-joints/)

A:
Yes, universal joints are legal.

(Asked by 18527 answer published at November 9th 2022)

Q158 Axon Robotics Odometry Bundle

Q:
Hi, this is a followup to question Q19. Following Q19 & Q21, Axon changed their product offering to just be a bundle of odometry-related parts (bearings, springs, housing for encoders, etc) from which a number of open-source odometry pods can be built. Part A) Is it legal to buy this bundle and build one of the open-source encoders with it? Part B) is legal to buy this bundle and build Axon's original odometry pod design (which is also open-source)?

A:
QA: Not this is not legal QB: No this is not legal.

(Asked by 21376 answer published at November 20th 2022)
Q171 Re: Q158 Axon Robotics Odometry Bundle Legality

Q:
Per Q158, the GDC determined the Axon Robotics Odometry Bundle illegal. We were wondering if the GDC can clarify exactly on what grounds this decision was made. The product is simply a bundle of parts that a team can theoretically use to build anything using the parts contained. With the bundle, we have the ability to use our own custom odometry designs with the parts. Would our own, custom design be deemed illegal as well? We cannot find anything in GM1 or GM2 that makes the bundle illegal.

A:
Answer Part 1 re: Axon Robotics odometry module: We believe [Q19 (/qa/19)] and [Q158 (/qa/158)] answers your question.

Rule RM02 in Game Manual Part 1 states in part: "It is the intent of FIRST to encourage Teams to design their own mechanisms rather than buying pre-designed and pre-manufactured [Commercial Off-The-Shelf (COTS)] solutions to achieve the game challenge.

The Axon odometry module is a COTS solution to the POWERPLAY Autonomous Period tasks that benefit from accurate Robot movement along the Playing Field Floor (e.x., Navigation, Cone Scoring, and Signal Bonus tasks) and is therefore an illegal COTS mechanism as stated in [Q19 (/qa/19)]. The universal Robot construction parts contained in the odometry module kit are allowed (e.x., bearings, screws, nuts, omni wheel) when they are used in a Team designed part or general construction part (e.x., extruded aluminum structural element). Custom COTS parts in the Axon odometry module (e.x., side plates) are not legal for Robot construction.

After the Axon odometry module kit was deemed illegal for Robot construction in [Q19 (/qa/19)], the custom parts appear to have been removed from the odometry module kit and the custom parts are now available as "open source" from Axon Robotics. This is an unsuccessful attempt to find a loophole in the Robot construction rules. The Axon Robotics custom odometry module parts (the original design or derived versions) even when they are manufactured by Teams are not allowed for Robot construction.

Answer Part 2 re: Team designed odometry modules: Teams may use their own custom designed and fabricated parts. For example, Teams may design and 3D print, mill, hand form, etc. structural parts for an odometry module. On the opposite end of the spectrum of allowed Robot construction parts, Teams may not incorporate a Commercial Off The Shelf odometry design and/or kit in their Robot.

(Asked by 10539 answer published at November 29th 2022)

Q174 Degree of Freedom Clarification

Q:
According to RM02, parts with 2 degrees of freedom are not allowed. Does this prohibit the use of https://www.revrobotics.com/rev-51-1555/ on a robot? If so, are the isolated out bearings adding degrees of freedom to the central pivots?

A:
This spinner can be considered a bearing mount, it is legal.

(Asked by 12051 answer published at November 23rd 2022)

Q176 GoBilda Battery

Q:
A follow up to Q76. It has been asked for years if the GoBilda 12v battery is legal and for years no explanation has been given for the answer of no. The battery uses the same cells, same capacity, same voltage, with the only difference a physical cell layout. There have been years when Rev battery and Matrix battery are out of stock but the GoBilda battery is in stock. This would be very helpful for teams to have an additional source for purchasing batteries. So why is it illegal?

A:
The GoBilda battery is not allowed because it is not on the approved list.

(Asked by 7592 answer published at November 22nd 2022)

Q183 Further clarification Q176

Q:
To further clarify Q176, why is the GoBilda battery not on the approved list?

A:
The only allowed Robot main power battery packs are listed in Game Manual Part 1, rule RE03. All of these batteries were at one time the battery pack recommended by the vendor that supplied the required Robot control system.

When transitioning to a next-generation Robot control system, the FTC program chose to continue to allow the prior seasons compatible 12V DC battery packs so that Teams may utilize their existing inventory of battery packs and continue to purchase more of the same battery pack model if that is their preference.

Fun Fact: The FTC program used a 7.2V DC battery pack prior to the 2008-2009 season.

(Asked by 7592 answer published at November 29th 2022)

Q192 Clarification around Q173, Q171, and Q158

Q:
Q173 says that it is legal to use open-source non-commercial odometry designs. Q171 says that it is legal to use the universal components in the CODEX bundle in a Team designed or general construction part. Q158 says that it is not legal to use the CODEX bundle in open source odometry designs. Does this mean that the universal non-custom parts in the CODEX bundle can be used in: A) A custom odometry design B) A non-commercial open source odometry design C) How do inspectors enforce this?

A:
Answer A: Yes.
Answer B: Yes.

Answer C: Robot parts and assemblies that are hidden from full view are difficult to inspect. The FIRST Tech Challenge program relies on a combination of robot inspector skill and Team Gracious Professionalism to assure compliance with Robot construction rules.

(Asked by 16379 answer published at November 30th 2022)

Q207 Badge Reel Legality

Q: The mechanics of a badge reel seem very similar to a tape measure, which is acceptable. Q1) Would these be legal - https://www.staples.com/Staples-Name-Tag-Reel-Clips-Assorted-5-Pack-36682-3747217/product_511099? Q2) If the reel portion is legal, would the clip on the back be considered a 2nd degree of freedom? Q3) Would it be legal if the clip was removed?

A: Q1: Yes, a badge reel is a legal COTS. Q2: The clip on back is not considered a second degree of freedom. Q3: The clip does not have to be removed.

(Asked by 12833 answer published at December 7th 2022)

Q215 Is the Open Odometry design legal

Q: Is the Open Odometry design legal? This relates to the illegal nature of the Axon Robotics odometry bundle that has several questions on, and has been ruled illegal. Many teams use the Open Odometry. This is not designed by the teams. Design is downloaded from Open Odometry website. Parts list gotten from Open Odometry. Axon Robotics supplies the parts from one source. A team must still assemble.

A: We believe Q173 (/qa/173) answers your question.

It is legal to use non-commercial open source designs. OpenOdometry (https://openodometry.weebly.com) was created by FTC team 18219 and is therefore an allowed non-commercial open source design.

The universal Robot construction parts contained in the Axon Robotics odometry module kit are allowed (e.x., bearings, screws, nuts, omni wheel). Any COTS custom parts or designs in the current or past Axon Robotics odometry kits are not allowed (e.x., side plates).

(Asked by 13474 answer published at December 8th 2022)

Q218 Ball bearings

Q: Are we allowed to use ball bearings in an enclosed space on the robot?

A: Loose bearing in a bag, box, or other enclosed structure is not allowed. Ball bearings in a bearing assembly are still allowed.

(Asked by 20373 answer published at December 11th 2022)

Q220 Clarification of Q192 and Q215 Regarding Universal Parts

Q: In the CODEX bundle, there is some gray area on what parts are universal. Here are the relevant parts in the bundle: shorturl.at/AENQ1. The main concern is the wheel inserts pictured above the omni wheel. They mount the omni wheel to universal shaft standards. The design behind the inserts was created by FTC 16379, for a different open source odometry pod (BabyOdo). These parts can be used outside an odometry pod in order to mount this wheel. Are these wheel inserts legal?

A: Based on the description of the wheel inserts provided in the question, they should be classified the same as the Axon Robotics custom COTS side plates that are addressed in Q171 (/qa/171), Q173 (/qa/173) and Q215 (/qa/215).

The wheel inserts contained in the Axon Robotics CODEX bundle are not allowed for robot construction.

Note: We understand that some teams may have already incorporated the illegal parts from the CODEX bundle in their Robot. Since there are other legal ways to build an equivalent odometry module, the use of these illegal parts for a limited time do not provide an unfair competitive advantage. Therefore, the Game Design Committee is allowing a grace period for teams participating in events that are about to happen. Teams may continue to use the illegal CODEX bundle parts through December 31, 2022. Starting January 1, 2023, the illegal CODEX bundle parts may not be used for Robot construction.

(Asked by 16379 answer published at December 15th 2022)

Q232 Is our intake legal (RM06 check)?

Q: Our head ref suggested that we confirm that our intake is legal. Our intake consists of a hot pink T-Mobile megaphone (cone-shaped) with a slot cut in one side and a servo/tracast wheel mounted over the slot which is used to pull in and push out scoring elements (cones). As far as we can tell this does not violate a) or b). Thank you.

A: Rule RM06 prohibits Teams from using the game element or a Team produced version of the game element in their robot. A pink megaphone, even though it is cone shaped, does not violate this rule.

(Asked by 15297 answer published at December 15th 2022)
Q242 Is this servo legal?

Q: We are wondering if this servo is legal and running into some confusion with its specs. We are operating it unmodified through the Control hub using the 3-pin connector or the Servo Power Module from REV. https://www.amazon.com/Hiwonder-LD-220MG-Digital-Bearing-Aluminium/dp/B07CMBMWZ2?ref=sr_1_4&crid=3GMAHAZU003TW&keywords= Servo+bracket&qid=1671766377&sprefix=Servo+bracket%2Caps%2C255&sr=8-4

A: It is not possible for us to rule on the legality of each and every servo.

As long as the servo meets the requirements in RE11 and has not been modified in any way that would violate RE16, it is allowed

(Asked by 20681 answer published at December 21st 2022)

Q254 Usage of an anti-static brush.

Q: Can we use a Martin Anti-Static Control Brush on our FTC robot during the competitions? I understand that it is a tool used to prevent static electricity build-up, causing unexpected reboots, but I would like to make sure it is not considered a violation of any rules before using it on our robot. Are these types of tools allowed in FTC competitions? The tool is located here: https://www.amazon.com/gp/product/B00EYRXEIA/

A: The legality of these brushes depend on how they are used. They are legal if used to manage static on the robot prior to a match. They can also be part of the robot itself providing they are not contacting the tile floor.

(Asked by 19970 answer published at January 4th 2023)

Q262 Q255 regarding the Axon MINI+

Q: We kindly ask that you reconsider Q255 regarding the Axon MINI+, which hundreds of teams have purchased. We believe they are legal as they: a) Abide by the limitations listed RE11, as RE11 does not specify a max number of servo connectors or imply the illegality of additional connectors. b) Does not fall under RE17 as it is a servo covered by the preceding rule RE11. c) Past precedent(bit.ly/S83547) has ruled such servos legal. If not, would the removal of this wire constitute legal servo?

A: Please see the answer to Q259 (qa/259)

(Asked by 14575 answer published at January 6th 2023)

Q267 Legal part?

Q: We are re-designing part of our lift and would like to know if a lead screw assembly from Amazon is legal? My research is leaning towards being ok, but would like to be sure before we purchase and rework it. Thank you very much in advance. https://www.amazon.com/Lineax-Support-Bearings-Flexible-Couplings/dp/B094HTHSNJ

A: Yes, this lead screw assembly is a legal part.

(Asked by 20512 answer published at January 18th 2023)

Q274 Based on Q220 and Q171 are these parts legal or illegal COTS components to use on a robot?


A: USB bracket: yes Mounting Plate: yes Expansion hub cable bracket: yes

(Asked by 8581 answer published at January 18th 2023)

Q312 Follow Up to Q99 and Swerve Module Kits

Q: After Q99 was answered, https://www.revrobotics.com/rev-21-3005/ was dropped. Assuming the kit itself is illegal, some of the parts in this kit are useful to teams and only available through this kit. Each part in the kit has a separate SKU. To what extent are teams allowed to use the parts provided in this kit?

A: Individually, the parts are legal but purchasing the parts with the intent of assembling a swerve module is illegal.

https://ftc-qa.firstinspires.org/admin/report
Q368 Are the all-black wires from Axon servos (except for the grey pwm pin) legal under GM1?

Q: Axon servos are wired with black cabling for the positive, negative, and encoder wires. Although they're already very common with FTC teams, is this at odds with GM1's requirement for a consistent wiring color scheme and different colors for positive and ground power? Although it would be possible to replace the wires with appropriately colored ones, this would be very time-consuming and jeopardize the reliability of the servos. Instead, would labeling the pins or adding colored tape suffice?

A: The wiring guidance in GM1 RE15 is for any wiring done by a team. Teams are NOT responsible for the color choices made by manufacturers.

(Asked by 16379 answer published at February 2nd 2023)

Traditional and Remote - Raw and Post Processed Materials

Q217 Can we use holographic vinyl?

Q: Can we use holographic vinyl as a design element as it gives us no competitive advantage or does it fall under rule re13?

A: Holographic film used as a decorative item is allowed. Teams should be aware that if the films interfere with their opponents robots, the Teams will be asked to remove the film. Films used as a mirror to get around rule RE13 is not allowed.

(Asked by 7002 answer published at December 11th 2022)

Traditional and Remote - Miscellaneous Robot Electrical Parts and Materials

Q32 Allowed modifications to sensor pins: Definition of illegal internal modifications?

Q: This question is related to <RE16>. Are we allowed to modify (i.e. cut or solder to) pins that are built into a Sensor module to make the module more usable? Or is this specifically classified as internal modifications that is illegal?

A: Changing/extending the connectors on sensors fits within the allowed modifications in RE16. Connections to other internal points within in the sensor would not be allowed (i.e. it would be considered an internal modification).

(Asked by 20771 answer published at October 4th 2022)

Q38 XT30 Power Distribution Block is this a legal part

Q: XT30 Power Distribution Block is this a legal ftc part

A: Yes, per RE15.d

(Asked by 14382 answer published at October 4th 2022)

Q40 Batteries for LED lights

Q: Game Manual 1 states that functional and/or decorative LEDs may be powered by Internal Commercial off the Shelf battery packs or holders. Is this constrained to just pre-made LED strips or custom cut / soldered LED strips as well? If custom LED strips are allowed, what constraints are there on the battery in question?

A: The battery packs allowed under RE07.d.i for powering light sources are specifically limited to only the battery packs that are built into COTS light sources and supplied by the manufacturer of those COTS light sources.

(Asked by 6299 answer published at October 4th 2022)

Q46 Is the Adafruit I2C QT Rotary Encoder legal?

Q:
Is the Adafruit I2C QT Rotary Encoder legal for use on FTC robots? It's an I2C-based "sensor" that will interface with the I2C ports on the REV Control Hub or REV Expansion hub. However, it requires that a team connect a rotary switch to use it, which makes it sound like it might violate <RE17>. The encoder is described at https://www.adafruit.com/product/4991. Thank you!

A: The above mentioned breakout board is actually two separate devices in one board. An addressable LED (NeoPixel) and an interface board to a standard rotary encoder. Both devices appear to be allowed. RE13 allows the LED. RE12c allows the addition of the passive rotary encoder to the board.

(Asked by 7172 answer published at October 14th 2022)

Q51 Custom Cases for Other REV Robotics Products

Q: In the past, custom cases for webcams or encoders have been ruled legal and not a violation of <RE16>. Does this ruling apply to a REV: A) Servo Power Module, B) Control Hub C) Expansion Hub, D) Spark MINI, E) Core Hex Motor, or D) 2M Distance Sensor?

A: Due to the need for inspectors to be able to readily identify the main components of a legal robot, custom cases for the listed parts are not allowed.

(Asked by 16379 answer published at October 13th 2022)

Q72 Can we use the digital ports for custom LED lights similar to REV Digital LED Indicators?

Q: We asked this last year and it was pushed to be evaluated between seasons. We worked with REV in 2019 and the digital ports can sink a reasonable current (they later came out with Digital LED Indicators, DLI). Can we make our own LED lights (LED plus passive resistor) using the Digital ports for switching ground and the 5V AUX port for power. Individually these are all allowed but we wanted to check. If not, are we allowed to make our own REV DLI equivalent using just the 3.3v digital port?

A: For this season, the answer remains no - LEDs and other light sources may only connect to the ports listed in RE13

(Asked by 10138 answer published at November 8th 2022)

Q76 GoBilda 12V Battery - Legal Part?

Q: Is the following GoBilda battery legal for use in FTC Competitions? NiMH Battery (12V, 3000mAh, XT30 Connector [MH-FC], 20A Fuse, 12-20) SKU: 3100-0012-0020 See https://www.gobilda.com/nimh-battery-12v-3000mah-xt30-connector-mh-fc-20a-fuse-12-20/, last visited Oct 19, 2022

A: No. The only allowed batteries are those listed in RE03

(Asked by 13643 answer published at October 24th 2022)

Q77 Infrared Proximity Sensor

Q: Are infrared proximity sensors allowed? For example E18-D80NK-N or SEN0239. These sensors project an infrared light to detect an object at a certain distance. There are also break beam sensors like the Adafruit IR 5mm Break beam sensor. Thank you!

A: This sensor appears to be legal.

(Asked by 7288 answer published at October 24th 2022)

Q93 Are we allowed to add external enhancements to the game pads?

Q: Our drivers would like to use an external enhancement to our game pad to allow it to have a wheel type driving mechanism similar to the one at https://www.thingiverse.com/thing:3049220 but with the logitech controller. Is this allowed?

A: Yes, mechanical enhancements to the game pad that do not involve opening up the game pad or modifying the electronics are legal.

(Asked by 12978 answer published at November 1st 2022)

Q97 REV Robotics magnetic sensor?

Q: We ordered the Rev Robotics Sensor pack from their FTC parts section. Included are (2) magnetic limit sensors: REV-31-1462. When looking at the allowed/legal parts list this PN# does not show up. Same question on the Rev#: REV-11-1271 Through Bore Encoder. This is a bit confusing as it is being advertised in the FTC section as well?

A:
As long as a sensor meets the constraints listed in RE12, it is legal per RE12 as long as it doesn't violate other rules (i.e. focused light sources, etc).

(Asked by 19727 answer published at November 8th 2022)

Q104 Is the GoBilda 1x15A Motor Controller legal

Q: Since the REV Robotics Spark Mini Motor Controller is sold out for the season, is the GoBilda 1x15A Motor Controller SKU 3105-0101-0015 legal? If not, there aren’t a lot of options because the REV Expansion Hub is also sold out.

A: We believe Q5 (qa5) answers this question. If not, please post a followup.

(Asked by 21534 answer published at November 8th 2022)

Q108 Legal Sensors

Q: Sorry, my Q97 question was confusing! These parts are not listed in the Legal-Illegal Parts list. Are the following parts legal? REV-31-1462 Magnetic Sensor REV-11-1271 ThruBore Encoder they appear to comply with Rule: <RE12> Sensors.

A: Please see the answer to Q97 (qa97).

(Asked by 19727 answer published at November 8th 2022)

Q141 Power Switch Placement on Robot

Q: Is there a specific placement/orientation of the robot power switch required on the robot? Clearly the switch needs to be in an accessible location, and the POWER BUTTON label needs to be placed on the robot to identify the location of the switch (per RE01), but I'm concerned that I might place my power switch and label on my robot and be required to move it later. Can competition staff at an event require a specific location/orientation for the power switch, and if so where?

A: The Main Power Switch must be visible and accessible. Other than that there should be no reason for the competition staff to request a change. Pro-Tip: place the switch in a position where it cannot be accidently bumped during a match.

(Asked by 12789 answer published at November 15th 2022)

Q163 Axon Robotics Odometry Bundle

Q: Hi, this is a followup to question Q19. Following Q19 & Q21, Axon changed their product offering to just be a bundle of odometry-related parts (bearings, springs, housing for encoders, etc) from which a number of open-source odometry pods can be built. Part A) Is it legal to buy this bundle and build one of the open-source pods with it? Part B) is it legal to buy this bundle and build Axon's original odometry pod design (which is also open-source)? Thank you!

A: We believe Q158 answers your question. If it does not, please rephrase your question and resubmit.

(Asked by 21376 answer published at November 20th 2022)

Q164 Are we allowed to use an AA Holder to power LED's on our robot?

Q: In game manual 1, <RE13> states that light sources may be powered by a COTS battery pack or **battery holder**. I need more clarification as to if a AA holder would be a legal "battery holder" to power LEDs with. The reason I want to do this is because I would like to power my LEDs separately so that my motors can run without an inconsistent power draw.

A: The only battery holders that are allowed for light source power are those that are provided as a part of the light source by the manufacturer (RE13.d.i)

(Asked by 14644 answer published at November 22nd 2022)

Q166 Custom circuit

Q: Please, could you share: what does mean a custom circuit in the <re17> section of rules?

A: For custom circuit, we use a standard dictionary-type definition:

custom - made specially for specific use

Circuit - an assembly of electrical components to perform a function

Please be aware that RE17 applies to all electronic devices that are not mentioned in the other robot electronics rules. Custom circuits is only one example of disallowed electronic devices.
Q172 Is Swaytail Premium 97mm Mecanum Wheel legal to use.

Q:
Can I use the below Mecanum Wheel on my robot, i am getting it from Amazon and its 97mm similar to Gobilda. Swaytail Premium 97mm Mecanum Wheel https://a.co/d/gxXQM!
Please confirm whether its legal to use.

A:
Mechanum wheels are legal, regardless of the manufacturer. However, because different wheels have different surfaces/materials, they may need to be evaluated for tile damage.

(Asked by 17504 answer published at November 22nd 2022)

Q175 LED Allowed power ports

Q:
Are the USB ports on the control hub allowed power ports for LED lights?

A:
No. The only allowed power sources for light sources are listed in RE13.d.

(Asked by 8866 answer published at November 22nd 2022)

Q182 Use the module

Q:
https://aliexpress.ru/item/4000699413842.html?sku_id=10000006190798077&spm=a2g2w.productlist.list.17.2a4313d4JSm7VP#coupon_anchor
https://aliexpress.ru/item/1005003244920492.html?sku_id=12000024831274011 Can we use this modules?

A:
No. The module appears to be either a voltage regulator or a voltage step-up device. Neither type of module is listed in RE01-RE16 and as such are not allowed per RE17.

(Asked by 17504 answer published at November 29th 2022)

Q191 REV Digital LED Indicator

Q:
Rule RE13 states that "Power sources for light sources are motor control ports, XT30 ports, 5V Aux power port and i2c ports." 1) Is the REV Digital LED Indicator (https://www.revrobotics.com/rev-31-2010/) legal if it is used as intended by connecting it to the DIO port of the control hub? In this config, power would be drawn from the DIO port's power and ground pins. 2) If not, could the wiring to the REV Digital LED indicator be modified to get power from the i2C port's power and ground pins?

A:
The REV Digital LED Indicator is not legal per rule RE13.d.

(Asked by 6220 answer published at December 13th 2022)

Q211 Clarification on on RE13 b. "control" of light sources on digital or servo ports

Q:
Our team would like to power RGB LEDs. Per RE13 d. ii. these can be powered by available XT30 ports. We would like to use this driver, https://www.sparkfun.com/products/13716 While the LEDs would be powered by the XT30 ports, control (on, off, or dimming) would need to come from the servo or digital ports on the control or expansion hub. RE13 b. allows for control by "compatible ports on the REV hub." Would these LED drivers be allowed to be controlled by servo or digital ports on the hub?

A:
The driver module referenced does not fit into the category of interface modules allowed by RE13 and is not allowed. This is a voltage step-down converter. As such, it is disallowed by RE17.

(Asked by 7330 answer published at December 8th 2022)

Q225 USB webcam connection to Rev expansion hub and RC android phone controller

Q:
For the setup for android phone controller and a webcam, are the instructions here (wiring diagram first one, not the diagram needed electric work)? https://github.com/ftctechnh/ftc_app/wiki/Using-an-External-UVC-Camera-and-a-Powered-USB-Hub If yes, the charger has a sensitive on / off button. Is it legal to protect this area with a partial hard cover or would this need to be marked as a power button similar to main power switch? If needs labeling, what would label say?

A:
Yes, while the information in the referenced web page is old (the specific rule references are out of date), the information is essentially correct.

A commercial USB battery may be used to provide power for your powered USB hub. If you are worried about the switches/buttons on the USB battery, there is nothing in the rule that prohibits you from protecting them. The only power switch that needs labeling is the main power switch. The USB battery buttons switches do not need specific labels.

(Asked by 8699 answer published at December 13th 2022)
Q227 Led lights

Q: Are underglow LEDS allowed for our robot?

A: Yes, as long as they follow the limits in RE13.

(Asked by 7002 answer published at December 13th 2022)

Q228 Is it allowed to switch the battery connectors?

Q: Last year we had problems with our batteries wires pulling out of the connector, raising a danger of it creating a short and potentially causing a battery to explode. At the suggestion of other teams we replaced the default connectors on our TETRIX (W39057) 12V DC battery pack with standard automotive 2 pin waterproof connectors. (search Amazon.com for Automotive 2-pin waterproof connector to see an example). No other changes were made to the battery or fuse. Is this modification allowed?

A: Yes, per RE15.e

(Asked by 12978 answer published at December 13th 2022)

Q245 Continuing search for allowable *switchable* LED lights/indicators

Q: In our continuing search for a legal way to have switchable LEDs that doesn't involve motor ports, SPARK mini ports, or ruled illegal solutions (Q191, Q211, Q72) we'd like to check an additional possibility. Can a multiposition rotary switch such as (a) https://www.amazon.com/uxcell-Channel-Rotary-Selector-Plastic/dp/B07JKWBWNF or (b) a single position microswitch be used in conjunction with a legal servo to provide a switched power source for legal LED with the power provided by 12v or 5v AUX?

A: No. As described, the usage would fall into RE17 Other Electronics and is not allowed.

(Asked by 10138 answer published at December 28th 2022)

Q250 REV Digital LED Indicator device (REV-31-2010) Legal?

Q: In light of the current response to Q191, please explain how the REV Digital LED Indicator device (REV-31-2010) is not legal. Since this LED is directly connected to a Hub DIO port and does not draw power explicitly from any other source, we would like to understand (under <RE13>.ii how "Teams may still use LED lights to signal events" because that indeed our Use Case - steady light no flashing. Sorry for my personal confusion because I've seen other teams use this device in matches.

A: The device is not powered from one of the legal power sources allowed for light sources listed in RE13 and as such is not allowed under current rules.

(Asked by 18738 answer published at February 2nd 2023)

Q268 Are standard dome (or bullet) LEDs allowed or are they considered focused lights?

Q: In an abundance of caution, we want to verify if COTS LEDs, e.g. the classic 5mm dome shaped single device (https://en.wikipedia.org/wiki/Light-emitting_diode#/media/File:Verschiedene_LEDs.jpg) are allowed, powered by a legal power source per <RE13d.ii>? We believe so but worry they might be considered "focused" Additionally, while they can be purchased with internal resistors (12V), can standard ones be used with a team provided current limiting resistor (cheaper, easier to adjust intensity)?

A: Yes. Typically, the dome shape at the end of an LED is intended as a diffuser, not as a concentrator.

Yes, current limiting resistors with LED's are acceptable

(Asked by 10138 answer published at January 11th 2023)

Q271 Servo 3 Wire Replacement

Q: Internally, Legal Servos have 3 wires that are soldered to the board. These Servo wires can rip out off or wear down from normal use. Assuming <RE15>b(iii) is met. can a team resolder the wires when the Team wants to: A) replace the wires with identical gauge and length B) lengthen the wire to avoid the need for an extension wire C) run thicker gauge wire to the servo for added durability. If no to all 3, what can Teams do to use their servos again?

A: All three cases of replacing/extending servo wiring (as long as no internal modifications are made) are examples of the types of modifications allowed under RE16

(Asked by 16379 answer published at January 12th 2023)
Q299 Are joiner boards legal?


A: Yes. these boards are just simple connectors and are allowed per RE15.i

(Asked by 21355 answer published at January 25th 2023)

Q314 Is a metal ball used to balance our robot illegal?

Q: We have a metal ball under our linear extension to help balance the robot. We have our grounding strip connected from our control hub to the chassis. Is the metal ball illegal since it electrically grounds the robot to the field? Is the ball legal since it is classified as a wheel and is not one of the specific banned wheels?

A: Items that electrically ground the robot to the playing field floor are not allowed per Rule RG01i, regardless of the shape, size etc. Therefore the metal ball that you have described is illegal.

(Asked by 7951 answer published at February 1st 2023)

Q328 Clarification around <RE15> and Allowable Servo Wiring

Q: Hey HQ Staff. We were reading through the FRC Q&A and saw Q45 which ruled that it is allowed for Servos to have common power wires from a single port on the SPM, while st having per-Servo signal wires. This got us thinking: A) Provided <RE15i.iii> is met, is this wiring configuration allowed for FTC as well? B) If instead of an SPM an Expansion/Control Hub was used, is this also allowed? Thank you and have a good day.

A: No. Shared power/ground wires but separated signal wires is not allowed.

For reference, FRC and FTC are distinct programs. Rules/ruleds for one program have no bearing on the other.

(Asked by 16379 answer published at February 8th 2023)

Q340 Are Pink/Grey Anderson Power Pole housings legal?

Q: For many years, our team has used Pink/Grey Anderson Powerpoles (https://powerwerx.com/anderson-powerpole-colored-housings) on motors to distinguish the 15AMP connectors from the 30AMP connectors but have consistently had pink on the positive side and grey on the negative side and to prevent students from accidentally plugging the motor into the power connection. <RE15>.f indicates only that the wiring must be consistent. Is the use of the pink/grey on motor cables legal?

A: Yes.

(Asked by 2901 answer published at February 15th 2023)

Q354 Use of ZED camera


A: Due to a combination of lateness in the season and the complexities of this camera/sensor system and the time required to assess the camera's legality, this camera is NOT allowed this season.

(Asked by 22924 answer published at February 22nd 2023)

Q370 Can we use mirrored acrylic side panels? re13?

Q: The kids are using mirrored acrylic side panels for protection and decoration on the robot. They are laser cut and cover most of the robot. I wanted to clarify with rule re13-light sources, if they can do that. Its not a functional light source but it is mirrored, they are green if it helps at all and laser etched with their logo. No game play intent just looks cool. thanks for any clarification

A: These panels are not illegal but teams should be aware that large mirrored surfaces run the risk of distracting other Teams during a match. If this happens, you may be asked to cover up the mirrors.

(Asked by 22523 answer published at March 12th 2023)
Q376 USB Battery Mounted To Driver Station Carrier?

Q: DS07 states that non-decorative electronics are not allowed on the Driver Station Carrier. Given that DS05 explicitly allows for a COTS USB external battery to be used to charge the Driver Station, does this mean that the COTS USB external battery cannot be in any way mounted or secured to the Driver Station Carrier?

A: No, DS07 does not apply to the USB battery allowed by DS05. DS07 allows a carrier to be used to organize and transport the components of the driver station, this includes a US battery as allowed by DS05. DS07.c applies only to non-decorative electronics that are NOT part of the driver station components.

(Asked by 3507 answer published at March 8th 2023)

Q393 Wire Gauge Requirements for COTS LED Light Strip

Q: Game Manual 1 <RE15> specifies the minimum wire gauges for power, motor, servo, encoder, and sensor wires. Is there a minimum wire gauge for COTS light sources?

A: Robots should use the following wire gauge size guidance for LED light sources:

1st: Follow the manufacturer’s recommendation. For example, the REV Blinkin LED Driver ships with a 24 AWG LED adapter cable, Robots may use 24 AWG or larger (e.g., 22 AWG, 20 AWG, 18 AWG, etc.) wires to connect their compatible LEDs to the REV LED adapter cable.

2nd: If the manufacturer does not specify a recommendation and the LED or LED strip has wires attached, use the same or larger size as the wires provided by the manufacturer.

3rd: If there are no attached wires and the LED manufacturer does not recommend a wire gauge, use the following guidance: a) 5V LEDs: 22 AWG or larger; b) 12V LEDs: 18 AWG or larger.

(Asked by 9889 answer published at April 6th 2023)

Traditional and Remote - Motors and Servos

Q7 Is Flashing Servo Firmware Illegal per <RE16>?

Q: Using a manufacturer provided programmer, certain servos can be flashed with manufacturer supplied firmware to put the servo in continuous or standard mode. If the: A) person using, B) vendor selling, C) or manufacturer producing the servos was to perform this action, would this be deemed an illegal modification of electronics and thus violate <RE16>?

For context, REV and goBILDA servos store the two different modes internally, but the swap is done via a bit-flip versus an upload.

A: Servo updates and/or programming done using vendor supplied tools and vendor supplied firmware images is allowed.

(Asked by 16379 answer published at October 4th 2022)

Q20 Axon Robotics Servos

Q: Are the Axon Robotics servos legal for FTC use? While the FTC rules regarding servos are relatively open, the programmable nature of these servos gave us cause to verify. Link is here: https://axon-robotics.com/products/duo

A: As long as the servos abide by the limitations listed in RE11, they are allowed; i.e. 6v or less operating voltage and a standard 3-pin servo connector.

(Asked by 365 answer published at October 4th 2022)

Q62 goBilda Yellow Jacket motors

Q: Are goBilda Yellow Jacket motors that are advertised for FTC Illegal?

A: goBILDA Yellow Jacket motors utilize the ModernRobotics/MATRIX 12V DC Motors and are legal per rule RE10c. The motors are allowed as are the single degree-of-freedom gearboxes attached to those motors.

(Asked by 22313 answer published at October 26th 2022)

Q68 Can goBilda servo power distribution board be used legally?

Q: Rule <RE09> specifically lists allowed servo power and control sources. The goBilda servo power distribution board (https://www.gobilda.com/servo-power-distribution-board-8-channel/) is functionally equivalent to the REV Servo Power Module. Can the goBilda servo power distribution board be added to the allowed sources list of Rule <RE09>?

A: The above servo distribution board is not mentioned in the other RE rules as an allowed device and therefore falls into RE17 - Additional Electronics and is not allowed.
Q78 GoBilda Dual Mode Servo Legal?

Q:
Is the GoBilda Dual Mode Servo (2000-0025-0002) and 3102 Series Dual Mode Servo Programmer (3102-0001-0001) Legal?

A:
If the servo has a standard 3-wire servo connector and is compatible with 6v drive, then it is allowed pre RE11. Servo programmers provided by the servo manufacturer are allow for servo configuration, but not as a part of a robot.

(Asked by 11329 answer published at October 15th 2022)

Q102 Is It allowed to use a motor port to energize an LED light

Q:
Since the GoBilda PWM switches are not legal and the Blinkin Led modual are not available. Is it allowed to use a motor port set to "unspecified" to energize a gobilda LED light panel?

A:
Per RE13.d.ii, motor ports on REV Expansion and Control Hubs may be used to control allowed light sources

(Asked by 20786 answer published at November 8th 2022)

Q247 Legality of Servo Signal Reversers

Q:
Is it legal to use a servo signal reverser (a wired device whose purpose is to reverse the direction of a servo signal) similar to this: https://hobbyking.com/en_us/tumigy-servo-signal-reverser.html

A:
No. This type of servo controller falls into the RE17 Additional Electronics category and is not allowed.

(Asked by 7393 answer published at December 28th 2022)

Q255 Are Axon MINI+ servos with an extra position wire legal?

Q:
Q20 asked about Axon servos, and the answer referred to RE11. This question is regarding the Axon MINI+ servos that have the normal 3-wire servo connector but also have a 1 bit analog absolute position wire (https://axon-robotics.com/products/mini). Are they legal by RE11 because they operate at 6V and have the 3-wire servo connector? The extra wire is basically an analog encoder sensor, which by itself, should be legal. But is it still legal when the servo and encoder are combined into one?

A:
No. These servos do not fit within the allowed servos per RE11 (i.e. they have more than a three-wire servo connector). With the added sensor output they fall under RE17 Additional Electronics and are not allowed.

(Asked by 14343 answer published at January 5th 2023)

Q259 We graciously request that you reconsider Q255 and/or clarify the answer

Q:
We ask you to classify the Axon+ servos as two devices that share a case. One device is the standard FTC legal servo, and one device is the FTC legal analog position sensor. The plus versions of their servos are only $5 more than the versions without the analog output. Affordability is key. Many teams have invested in the Axon+ servos, largely due to the precedent ruling from skystone that allowed the same thing for an adafruit servo Otherwise please allow the analog wire to exist unconnected.

A:
We normally don't answer questions after Thursday at noon Eastern time ... but in the interest of not ruining a team's weekend ... Teams should not rely on prior season's rulings to determine the legality of robot components. When in doubt, you should always ask.

For the remainder of this season only (unless explicitly allowed under next season's rules) servos with a single analog sensor type of output are allowed.

(Asked by 6832 answer published at January 6th 2023)

Q389 Can we run two motors off of one control hub port?

Q:
We have an implement powered by two motors. We always want these motors to run in parallel, and they are physically/mechanically connected. We would like to solder a y-cable and run both motors off of the same port on the control hub, as the hub is capable of handling this wattage. This is not an attempt to use more motors than we are allowed. We aren't clear from RE15 (or other rules) whether this is a violation, but we had a judge warn us about it.

A:
There is nothing in the current robot construction rules that prohibits this. While not illegal, this is not a recommended practice. Without careful selection and management of motors and their usage, it is possible to build a robot that can exceed the current limits for the motor ports leading to potential robot failure and/or damage to robot components.

(Asked by 15005 answer published at March 30th 2023)
Traditional and Remote - Control System

Q17 Is it legal to add a touch display for use with the REV Control Hub

Q: Under rule <RE07> robots which are using a smart phone have available a touch screen to view status and configure the robot. However Teams using the REV Control Hub do not have any way to diagnose problems on the robot. Given that Touchscreens such as https://www.sunfounder.com/collections/touchscreens/products/10inch-touchscreen-for-raspberrypi work with the Control HUB and offer no play advantage but provides FTAs with a way to diagnose the robot, would it be legal to use them?

A: No.

Touchscreens/displays would fall under RE17 as additional electronics and are not allowed.

(Asked by 2901 answer published at October 4th 2022)

Q28 we want to use an optical mouse for odometry that illuminates the surface with an infrared

Q: we want to use an optical mouse for odometry that illuminates the surface with an infrared LED for its sensor input and light source that plugs into the control hub in the same way that uvc cameras do. it does not use lasers. is this legal?

A: Per RE12, allowed sensors may only be connected to specific inputs on the REV Control and Expansion Hubs; I2C, digital I/O, encoder, and analog inputs.

Sensors may not connect to the USB interface.

(Asked by 10738 answer published at October 4th 2022)

Q66 Control Hub & Driver Hub Nomenclature

Q: We have multiple Control Hubs and Driver Hubs in use. Our naming convention is <team number>-<internal Id>-<hub acronym> where team number is self-explanatory internal Id is a character, e.g. A, B, .. to distinguish each Hub pair uniquely hub acronym is either DS or CH as appropriate This nomenclature fails the Self-Inspection Report correctly on account of <RS01>. My question is how can teams bring multiple Hubs to matches with pre-configured settings for only one robot? Thanks.

A: Answer edited 10/14/2022 7:00am et - This question is answered in Game Manual Part 1 Rule RS01-Android Device Names. Based on your question, you should change CH to RC.

(Asked by 18738 answer published at October 13th 2022)

Q101 Using D435 Distance Camera without laser

Q: Distance cameras like D435 can be used with the laser turned off. The laser produces a visible red dot when turned on. Would this camera be allowed if the laser is turned off?

A: No. The presence of the laser makes the camera violate RE13's prohibition on lasers

(Asked by 19895 answer published at November 8th 2022)

Q105 phone usage

Q: I'm looking into using the correct phones for our robot. Regarding rule RE07 my team was able to get a Moto Z2 Force device directly from Motorola to be able to use on our robot but the device is not listed on the list of devices. Is there a way to have this phone added to approved devices, as this device is running the same operating system and android version as other devices?

A: We do not allow any phones outside of the list in rule RE07. The specific phones listed in this rule have been tested and are compatible with the FTC software. Using phones outside of this list could put teams at a competitive disadvantage, therefore are not allowed.

(Asked by 15387 answer published at November 16th 2022)

Q123 Secondary Camera Display on Driver Hub

Q: Are you able to run a secondary display on the driver hub? For example, a camera attachment on the robot creates images the drivers can view on the driver hub (in a split screen format with the driver station app).

A: No. RS09 prohibits the streaming of audio, video or other data from the robot to the driver station.
**Q149 Control Hub Driver Update**

**Q:**
Our team has only one Control Hub. However its USB-C port is not working anymore. REV cannot repair it until their stock is replenished. There will be an update to the SDK very soon. We will not be able to upgrade the Control Hub with the new drivers using the REV Hardware Client. Will there be an exception (during Inspection) for teams such as ours that are facing this predicament? Thanks.

**A:**
If you connect your Laptop with the REV Hardware Client installed to the Wi-Fi network of your Control Hub, the REV Hardware Client will be able to detect the Control Hub and able to perform all actions wirelessly on the Control Hub the same as if it was connected via USB-C.

(Asked by 8743 answer published at November 10th 2022)

**Q200 REV Control Hub v0 REV-31-1152 FTC 22/23 legal?**

**Q:**
We got for our participation at the FTC SCRIMMAGE ITALY event in March 2023 an old second hand FGC kit with a REV Control Hub v0 REV-31-1152. We can not find it in the legal parts list for the current FTC 22/23 season. The Android Robot & Driver Apps ver. 8.1 load fine without problems but with a warning about the Control Hub OS. Also Blocks code seems to run fine without issues. So is this old Control Hub legal to use for a traditional 22/23 FTC event?

**A:**
The REV Control Hub v0 REV-31-1152 may be used for unofficial scrimmages or a demo, but cannot be used in an official tournament.

(Asked by 18738 answer published at November 17th 2022)

**Q289 Control Hub REV-31-1595 FTC 22/23 legal?**

**Q:**
We have a Control Hub and it's version is REV-31-1595. It is a legal part for the FTC season 22/23 in an official event? It does not appear in the legal parts but it is the version that appears on the Rev page Thank you in advance

**A:**
The version of control hub mentioned is the current version and is listed in the explicitly in the 2022-2023 Legal and Illegal Parts List document (top of page 3) as an example of a allowed REV Control Hub

(Asked by 22850 answer published at December 13th 2022)

**Q359 Power switch on turret**

**Q:**
Is it legal to have a power switch mounted on a turret, provided it is well-labelled and all other constraints for the switch have been met?

**A:**
As long as the Main Power Switch is clearly visible in all turret orientations, then it is legal to put your Main Power Switch on a turret.

(Asked by 5356 answer published at February 21st 2023)

**Q365 PS4 DualShock 4 Wireless allowable colors**

**Q:**
The ASIN (B01LWVX2RG) listed in GM1 <DS03>c is for the Jet Black color of the DualShock controller. However, this controller also comes in various colors each with a different ASIN number. Is only the Black version legal or can a team compete with any color?

**A:**
The other colors of the same model DualShock controller are allowed to be used.

(Asked by 10836 answer published at February 28th 2023)

**Traditional and Remote - Sensors**

**Q11 Is the OctoQuad Encoder Sensor legal?**

**Q:**
https://www.tindie.com/products/digitalchickennabs/octoquad-8-channel-encoder-sensor/ It is a smart, non-user-programmable sensor like the allowed PixyCam New teams can only get a single REV Hub due to shortages; SPARKminis allow running extra motors, but without encoder feedback this is unfair disadvantage. Adding an OctoQuad allows encoder feedback from all motors. OctoQuad satisfies RE17 more than the REV Blinkin which contains an Arduino for which REV has public programming documentation.

**A:**
No.
The product is a sensor interface board and requires sensors to be plugged into it to enable operation. Each of these sensors would violate RE12 since they do not plug into allowed inputs on a REV Control or Expansion Hub.
Additionally, since this type of sensor interface is not specifically addressed in any of the other RE rules, it falls into RE17 as additional electronics and is not allowed.

(Asked by 17160 answer published at October 4th 2022)

Q18 Use of color sensors for Signal detection

Q: Would anything prohibit the use of a color sensor or sensors for detecting the orientation of the signal / signal sleeve in lieu of using image recognition?

A: No. There is nothing in the robot construction or gameplay rules that dictates what sensing technology is used to detect the orientation of the Signal/Signal Sleeve.

(Asked by 12915 answer published at October 4th 2022)

Q30 OpenCV AI Kit: OAK—D

Q: Can we use the openCV AI Kit OAK-D camera for vision this year? Here is the site page for it: https://store.opencv.ai/products/oak-d It appears to be similar to the Intel T265, except it has not been discontinued.

A: It would appear that this camera is designed to have AI models trained and uploaded to it, providing an effective co-processing type of operation. As such, it should be considered as a programmable device and is not allowed.

(Asked by 10091 answer published at October 14th 2022)

Q41 Is the SEN0304 Ultrasonic Distance Sensor from DFRobot legal for use?

Q: We are wanting to use a ultrasonic distance sensor for our robot this year but a Modern Robotics Range Sensor is hard to find and expensive. Is the SEN0304 legal?

A: Any sensor that is compatible with the REV Control or Expansion Hub, connects to the allowed inputs, and does not violate other rules is allowed.

(Asked by 17235 answer published at October 4th 2022)

Q65 Are LIDAR Sensors Legal?

Q: We are looking into other ways to track our robot's movement during autonomous and were wondering if LIDAR was possible. We found these two sensors (https://www.adafruit.com/product/4010 and https://www.adafruit.com/product/4441) that we think would work and are wondering if they violate RE13 as they produce "directed light sources". Assuming we're able to attach these sensors to a REV hub, could we use them in a real match?

A: No, per rule R13a. LIDAR is both a laser and a focused/directed light source and is thus not allowed.

(Asked by 14779 answer published at October 13th 2022)

Q85 Is this sensor legal?

Q: We are looking into other ways to track our robot's movement during autonomous and were wondering if this sensor that we found was legal as it uses an LED which may fall under the category of RE13 as it does produce a "directed light source". Here is the sensor we found: https://www.adafruit.com/product/4441. Assuming we can connect this sensor to a REV hub, are we able to use it?

A: With the obvious lenses on its front surface, this sensor appears to violate RE13.a.

(Asked by 14779 answer published at October 26th 2022)

Q86 Is the DFRobot HuskyLens sensor legal for use?

Q: Just checking for clarity: Is the Gravity:HuskyLens sensor legal for use? It connects to the REV Expansion/Control Hub via I2C. Like the PixyCam, it is not user-programmable but has modes to train the sensor on different objects and vision patterns. The sensor is available from DFRobot as well as other vendors. More details about this sensor can be found at https://www.dfrobot.com/product-1922.html and https://wiki.dfrobot.com/HUSKYLENS_V1.0_SKU_SEN0305_SEN0336#target_3 . Thanks, FTC 7172

A: This sensor appears to be equivalent to the PixyCam and is legal for use.

(Asked by 7172 answer published at October 26th 2022)

Q119 Are two UVC cameras allowed on the robot?

Q:
This question relates to <RE14>. Are two UVC cameras allowed on the robot as long as they are attached to the Rev control hub or robot control system through a powered USB hub?

A:
Yes. This is allowed and supported.

This is a common use-case among teams, there is even an OpMode sample designed to help teams use two cameras (you can find it in the Samples under ConceptTensorFlowObjectDetectionSwitchableCameras). The major caveats with using two cameras are:

1. You can only have one camera active as a UVC source at once; the sample code provided shows how to change which camera is currently the “active” camera.
2. Even with a Control Hub, teams using multiple cameras need to use a powered USB hub – the Control Hub only provides a limited amount of current to the USB ports, and more than one USB Camera may draw more current than the Control Hub can provide on its own. A powered USB hub (like the REV UltraUSB Hub) can power two USB cameras easily.
3. If you’re configuring and aligning multiple webcams during Pre-Match setup, be sure not to violate rule G13e (do not delay the start of the match).

Q155 Passive self-made electronic system

Q: Are we allowed to use passive self-made electronic system as a sensor? We want to use optocouplers and self-made electronic circuit that contain only passive elements as an encoder, are we allowed to do that?

A: No. This type of fabrication of a sensor would fall under the "custom circuits" portion of RE17

Q173 Followup to Q158: Is it legal to build any open-source odometry pod?

Q: Various designs for odometry pods exist like OpenOdo and they are widely used in FTC competition. As Q158 has clarified that we cannot build OpenOdo using Axon parts, A) is illegal to include OpenOdo or other open source designs at all? or B) is it only illegal to use the Axon bundle to build OpenOdo? We are having a really hard time knowing what is legal and how to procure parts for odometry. P.S. apologies for past Q163 duplicate; system would not let me delete.

A: Answer A: It is legal to use non-commercial open source designs (e.x., OpenOdo).
Answer B: The Axon Robotics and all other commercial odometry custom designs and/or custom component parts are illegal.

Q189 Use of Endoscope USB camera

Q: I was wondering if a USB Endoscope camera would be legal. The use case for this would be to stick it down the middle of a cone for a targeting system, and be able to see the pole as the robot moves the arm/lift up with the cone in possession. Reading the rules (RE14) it only says a UVC compatible camera. Is there any rule that an endoscope camera without a light source would violate? (I haven’t found a specific product for illustration yet)

A: There is nothing in RE14 that would prohibit an endoscopic type of camera. You are correct that a light source included would cause the camera to be disallowed, unless the light source conforms to the limits of RE13 for power/control.

Q198 Clarification on RE13

Q: Our team is looking for clarification on <RE13.a>. We are planning to use the REV Color Sensor V3 to help illuminate our Signal Sleeves at a distance for better accuracy when scanning with our camera (the light is projecting parallel with the floor about 3.5cm high) It is not possible to turn off the LED programmatically between autonomous and teleop periods as it is a physical switch. Does this count as a focused or directed light source? Are we allowed to have the light on the entire match?

A: The light within the sensor is not constrained by RE13. It is a simple LED designed to provide a relatively pure white light source to improve the color readings determined by the sensor. It is allowed to be on.

Q201 REV Color Sensor Light

Q: Hello. The list of legal parts states that the REV Color Sensor V3 (REV-31-1557) is legal. However, there is a light on the front that can be switched on/off (manually). Can this light be ON or does it violate the Light Source rule (RE13)? The REV datasheet states that this light should be ON for the sensor to work properly on unlit objects. Thank you

A: As you mention the sensor is listed as legal. There are no limitations the on features of the sensor for its usage. The light on does not violation RE13
Q243 Can we have two UVC cameras active at the same time?

Q: We have 2 cameras on our robot, and we use OpenCV, which supports concurrent camera use. In Q119, it says that, "You can only have one camera as a UVC source at once." Is this a limitation with the built in Vuforia/Tensorflow tracking, or is it a rule that we can only have one camera active as a UVC source at a time.

A: We believe Q119 answers this question. The limitation is a vision processing limitation.

(Asked by 20267 answer published at December 6th 2022)

Q244 Do we need to use a powered USB hub if using more than one UVC camera?

Q: Q119 states "teams using multiple cameras need to use a powered USB hub." We currently have two UVC cameras on our robot working fine without a powered USB hub. Is this rule that a powered USB hub is required for multiple cameras, or is this a suggestion to help ensure teams don't have issues?

A: This is a recommendation based on power consumption of the cameras.

(Asked by 14343 answer published at December 21st 2022)

Q246 Are three or more UVC cameras allowed on the robot?

Q: During the interleague, our robot passed inspection with two UVC cameras but the inspector seemed to suggest that three would not be allowed. Q119 states that two are allowed but does not appear to place any limit on additional cameras. Can you clarify whether three or more UVC cameras is permitted?

A: There is nothing in the rules that limits the number of cameras that can be built into the robot. Be aware that each additional camera on the USB bus requires additional USB power.

(Asked by 14343 answer published at December 28th 2022)

Q251 5V Addressable LED Strip

Q: Is the (REV-11-1198) 5V Addressable LED Strip legal when it is driven by REV BLINKIN Driver (REV-11-1105)? The 12V version of the strip is not very useful for our "ergonomic" use and prefer the addressable nature of the 5V version. We are mindful of the legal power sources and voltage restrictions. The Strip in question operates at 5V but the source is the BLINKIN Driver which will operate through XT30 connectivity with a hub and rely on PWM signalling. Thanks.

A: Yes. The REV Blinkin Driver you reference is an example of the types of COTS interface modules allowed by RE13c.

(Asked by 18738 answer published at December 28th 2022)

Q257 Sensor Interface Bridges

Q: I have a sensor that I would like to use on my robot, but it's an SPI sensor instead of I2C. I also have a simple passive SPI-to-I2C bridge that will allow my sensor to communicate with the I2C bus on the Control Hub. Am I allowed to use the SPI-to-I2C bridge on my robot between the Hub's I2C bus and my device per RE12c even though it's not explicitly called out in documentation from the manufacturer for the device? Q46 is the closest example similar to this, so I am checking before I do it.

A: No. Sensor interfaces as you describe would fall under RE17 Additional Electronics and as such are not allowed. The allowance in RE12c for passive electronics is intended to cover simple passive components such as resistors or capacitors that a sensor manufacturer may recommend as a part of using their sensor.

(Asked by 12789 answer published at January 5th 2023)

Q270 Is LoonyOdo + REV encoder FTC legal?

Q: Please take a look here: https://www.theloonysquad.com/open-source/loonyodo This is a CAD design which some teams are using. The COTS REV encoder is disassembled and some of its inner parts are removed and installed into a 3D printed casing. Will this be considered legal for FTC? or will it violate RE02 or some other rule?

A: The modifications to the REV Encoder present challenges for inspectors in verifying the type of sensor. The case replacement would be allowed, but only with supporting documentation that details the process was followed and the steps. Suggestion would be to include pictures that show the disassembly of the original REV Encoder and the assembly of the new encoder housing.

https://ftc-qa.firstinspires.org/admin/report
Q294 NAVX2-Micro Navigation Sensor

Q:
Is the NAVX2-Micro Navigation Sensor sold by AndyMark FTC legal

A:
It is not possible for us to rule on the legality of every possible sensor. Apply the conditions of RE12 to the sensor - is the sensor able to be connected via allowed ports (RE12.a) either with or without a adapter cable or level shifter (RE12.b) So since the NAVX2-Micro satisfies these two constraints and isn't subject to any of the other constraints of RE12, it is legal

Q316 Distance Sensor

Q:
The REV ToF 2m Distance Sensor supply is constrained. I encountered the RCWL-1601 at Hardware Component Overview/Robot Controller Overview/Sensors at FTC Docs 0.1 I know this sensor as HC-SR504. Can our team substitute this equivalent model (identical specs) for our solution? We have spare ports and would like to use multiple quantities of these. Thanks.

A:
The sensor you list is an ultrasonic rangefinder and is part of a general class of allowed sensors. The REV ToF 2m distance sensor (REV-31-1505) is a laser-ranging sensor. While the two perform similar functions, there are not the same technology. The REV sensor is the only allowed laser-based sensor for FTC

Q330 Rotary Encoder with LEDs

Q:
We have some rotary encoders that combine several features on a single board. https://github.com/ahmsville/Magnetic_rotary_encoding (Model 1) One feature is addressable LEDs. Another is Hall effect sensors that read the magnetic field. There is also a chip for digital-to-analog conversion. The features can be connected individually so that one wire connects to the sensor and another to the lights. Does it conflict with the rules to connect two different wires to the same board?

A:
With the way this collection of devices is combined, there is no way to connect/use it without violating either the LED power rules or the sensor power rules. i.e. LEDs cannot be powered from sensor/digital I/O ports while sensors cannot be powered from anything other than the analog or digital I/O ports.

There is no means to connect this device legally

Q331 Strain Gauge Sensors

Q:
Can we use strain gauges that use HX711 breakout boards as sensors? https://www.digikey.com/htmldatasheets/production/1836471/0/0/1/hx711.html is the datasheet of the breakout board. And https://learn.sparkfun.com/tutorials/getting-started-with-load-cells/all explains how to use them. We see the breakout board as part of the sensor, is this fine or does it have to meet the definition of passive circuitry? And if so, does it?

A:
The breakout board described does not fit the description of passive electronics and falls into the category of additional electronics and as such is not allowed.

Q341 Rotary Encoder with LEDs Part II

Q:
Regarding Q330, doesn't the answer to this question contain an error? <RE 13> d.ii states that LEDs may be powered from I2C ports among others. The answer also states that there is no way to connect it legally, but it is possible to connect a single analog sensor wire or I2C sensor wire to the board to just read the Hall effect sensors, not even connecting to the lights. Wouldn't that be legal?

A:
Q330 (qa330) is the final answer for this device under the current rules.

Q343 Can we use an off the shelf Opto-Coupler

Q:
Can we use the following opto-coupler - https://www.amazon.com/Measuring-Optocoupler-Interrupter-Detection-Arduino (5pcs) /dp/B08977QFKS/ref=sr_1_1?keywords=optocoupler+sensor&qid=1676088527&srl=81 It only has 3 pins - 1) 5V 2) GND and 3) Digital OUT and does not require any custom circuits. We will just connect it directly to the control or expansion hubs' digital port.
A: Yes

(Asked by 11039 answer published at February 15th 2023)

### Traditional and Remote - Robot Software Rules

#### Q3 Reuse of previous software

**Q:** May we reuse last year’s software, replacing obsolete code with new game specific logic and other improvements?

**A:** It depends on a number of factors given that requires that you update at least to the Minimum FTC Software Version (version 8.0). If you’re a Blocks user this can be accomplished by updating the Robot Controller and Driver Station apps (preferably through the REV Hardware Client), and no changes are necessary in your Op Modes (besides game-specific changes, as you pointed out). If you’re an OnBot Java user you must also update your apps but there may be specific changes required in your Op Modes - see the Breaking Changes section in the SDK 8.0 release notes. However if you’re an Android Studio user you must not only update the Driver Station app to at least version 8.0 but you must also merge the SDK 8.0 FtcRobotController repository changes into your Android Studio Project; this is in addition to any changes required in your Op Modes based on SDK 8.0 Breaking Changes.

(Asked by 17993 answer published at October 17th 2022)

#### Q39 Programming in Kotlin

**Q:** Kotlin can compile into JVM bytecode and is interchangeable with Java. Are there any rules against using Kotlin to program the robot?

**A:** While there is no rule prohibiting Kotlin as a programming option, it is not one of the recommended tools as listed in RS02. Teams that use Kotlin due so at their own risk and should expect that there will not be technical help/support available at events in the case of software issues.

(Asked by 14779 answer published at October 11th 2022)

### Traditional - Game Rules

#### Q326 Clarification on Q194 and G15

**Q:** Question 194 asks about using a cone to align the robot before initialization. This year, teams will regularly align a gripper height or width utilizing the preload cone. This has occurred for many seasons based on the game's scoring element. This is aligning the robot. Why are some alignment actions with game elements allowed?

**A:** This question uses an overly broad interpretation of the meaning of Robot setup alignment in rule G15. Rule G15 is intended to constrain how the Drive Team positions their Robot on the Playing Field. Drive Team manipulation of a Robot assembly to position their Pre-Load Cone is allowed. Note: Using a Cone to determine where to position a Robot on the Playing Field is not allowed per rule G15.

(Asked by 13474 answer published at February 7th 2023)

#### Q342 Request for clarification on rule <g8> +/- 1 inch field tolerances and rule GS6

**Q:** We are writing to request clarification on the +/- 1 inch field tolerances in regard to cone stack penalties. As per the rules, the Playing Fields and Game Elements may have tolerances that may vary by +/- 1.0 inch. However, in fields with a 1 inch variability, it can be challenging to accurately measure the movement of the cone stack during a live game setting. Can the rule be interpreted as only giving penalty when the cone is off the tape? This could possibly provide a more objective measure.

**A:** No, the proposed change would allow a Cone Stack to move approximately 23 inches towards the inside of the Playing Field before rule GS6 Penalties apply. The Game Design Committee discussed many options for determining how to determine when Cone Stack moment is consequential. Using the Cone Stack location tape was one option that we considered. All things considered, the Game Design Committee selected the one (1) inch movement guidance in Q204 (lq/a204). Note: The rule G8 +/- one (1) inch Playing Field tolerance should not come into play for the Cone Stack location. The orange box notice for rule G8 states: "Playing Field and Game Elements are expected to be manufactured, assembled, and set up using a high standard for dimensional and location accuracy. The intent of the generous +/- 1.0 inch tolerance is to accommodate unintentional size and location variations that may occur. The tolerance is not an excuse for intentional or imprecise accuracy construction or setup."

If a Cone Stack is not in the correct location during Pre-Match Robot set up, the Drive Team may ask an FTA, FTAA, or referee to reposition the Cone Stack so that it is in the correct location. Upon request, field personnel are expected to correct Playing Field setup errors per rule G12. This is also the appropriate time to notify field personnel about any Playing Field set up concerns.
Traditional - Gameplay - All Match Periods

Q6 Is it a penalty to descore your own team’s scoring element?

Q:
Is it a penalty to descore your own team’s scoring element? I know descore opposing alliances scoring element is a penalty but what about your own alliances? I just want to clarify that if you accidentally descore your own team element from a terminal it is not a penalty.

A:
A Robot is allowed to descore their corresponding Alliance’s Cone from a Junction and also from their Alliance’s Terminals.

Rule GS5 c) prevents a Robot from descore any Scored Beacon from a Junction during the End Game.

Q14 Tipped Junction Pole

Q:
If robots stack so many cones on a junction, that the pole tips over, either because it was bumped or the weight of the cones tips it, and the weight of the cones prevents the spring from uprighting the junction pole, do the cones that are positioned on the junction pole still score even though they are laying on their side, touching the floor?

A:
Cones have a Score value only when they are Secured on a Junction. The definition of Secured is in section 4.3 of Game Manual Part 2.

The Cones in this scenario satisfy some, but not all of the requirements for being Secured. The last sentence in the definition of Secured states that a Cone is Secured only if the large opening of the Cone is facing towards the Playing Field Floor. Therefore, the Cones described in this scenario have zero Score value.

Q16 GS10 What happens if you place your cone on opposite alliance's up side down cone on pole?

Q:
GS10 said "Robots may not place their own Alliance’s Cone or Beacon on top of an unscored opposing Alliance's Cone or Beacon. A Minor Penalty is assessed for ...". So if the opposing Alliance put their cone up side down on the pole (this won't score), when I put my cone on it (correct direction), I will get a penalty? If this is correct, any team can put up side down cone there, to “own” the pole in practice (the other alliance has to get minor to score that)

A:
Rule GS10 does not apply to an upside-down Cone on a Low, Medium, or High Junction. A future release of the Game Manual Part 2 will include a clarifying statement.

Q26 Definition of grasping with respect to junctions

Q:
If a robot comes into contact with a junction (pole) with the intent of limiting its motion, would that be considered grasping? Ex 1: Robot drives into the pole, causing it to bend away from the robot slightly. Ex 2: Robot has a single beam that extends to prevent pole from moving left. Ex 3: Robot has 2 beams that prevents it from moving left/right. Ex 4: Robot has 3 beams that prevent left/right AND backward motion.

A:
Two or more points of Robot contact that apply opposing force to a Junction pole is grasping and violates rule G25.

1) This action does not violate rule G25 if the Robot's point(s) of contact with the Junction pole are all in a single vertical plane (i.e., there is no opposing force contact).

2) This action does not violate rule G25 if there is only one point of contact between the Robot and the Junction pole. Rule G25 is violated if the front of the Robot and the single beam extension both contact the Junction pole.

3 & 4) These scenarios violate rule G25 because they have two or more opposing force points of Robot contact with a Junction pole.

Q44 Additional phone/tablet for the coach

Q:
Is it legal for the coach to bring another phone/tablet on the field? The phone/tablet won't have any network connection on. This year's game needs some strategy, so we would like to develop some program running on the phone/tablet to help the coach.

A:
This would violate rule G11. Although the tablet will not have network connection, having an additional tablet to strategize during a match is still considered illegal match communication to the drive team. Part of rule G11 states "Items that may be mistaken by a casual observer as being in violation of this rule should not be brought to the Playing Field."
Q47 Upside-down cone on scored cone on low junction preventing opposing alliance scoring

**Q:** Suppose a robot scores one of its cones on a low junction, then places another one of its cones upside-down on the same low junction. This would effectively make any further scoring by the opposing alliance on that low junction impossible, since the pole would not pass through the top hole of the cone. Q16 clarified that rule GS10 would not apply here but the opposing alliance's cone would still not be scored due to its position. Would a team be able to use this strategy to prevent scoring?

**A:** This scenario is a good example of a G29 rule violation for illegal use of Game Elements. Robots may not deliberately use Game Elements to ease or amplify the difficulty of any Scoring or game activity.

(Asked by 17346 answer published at October 4th 2022)

Q49 Can a V shaped "guide bar" be used for depositing cones?

**Q:** Can the robot have a V shaped guide bar attached to its out-take mechanism? Robot pushes the Junction slightly until the Junction slides into the V. Then robot drops the cone: like this: https://i.imgur.com/idxNO5v.png 1 Robot will not touch the bottom of the Junction 2 Robot will touch the junction near its top end 3 V guide bar will have only one single point of contact with the Junction (left OR right side of the V). 4 No grabbing action / mechanism is used 5 No opposing forces are used

**A:** A Junction pole fully engaged in a "V" shaped apparatus has two points of contact. This is an example of illegal grasping of Game Elements per rule G25. The illustration included in the question doesn't appear to demonstrate safeguards that guarantee there can be no more than a single point of contact with the pole. It looks like the "V" shape apparatus is able to fully engage the pole, resulting in an illegal grasping action.

If the Team is confident that it is impossible for their "V" shaped bracing mechanism to grasp a Junction pole, this should be demonstrated to the Head Referee before the start of Qualification Match play so that the Robot is not suspected of violating rule G25 during gameplay.

(Asked by 15167 answer published at October 6th 2022)

Q54 Is Parking On The Ground Junction Blocking All Access Regardless Of Where Robots Are?

**Q:** In response to Q42:In the past, rules were designed to limit the control of elements & positions to promote fair play & to prevent robots that intentionally didn't move to ensure that all teams could have equal access to scoring elements & positions. Is a robot that is parked over a ground junction 1) prohibiting (blocking) all access to teams from scoring there no matter where robots are or would a ref say to score at another one? 2) disallowing an alliance partner cones from the junction area?

**A:** The scenario in Q42 did not include interactions with an opposing Alliance Robot.

Depending on the scenario, rule G28 or GS8 will come into play when an opposing Alliance Robot attempts to Score on the Ground Junction referenced in Q42.

(Asked by 5155 answer published at October 8th 2022)

Q55 Define "Grasp"

**Q:** Questions #26 and #49 seem to define "Grasping" as "Two or more points of contact between the Robot and [Junction]". Is this defined anywhere in the Game Manual?

**A:** For the POWERPLAY game, two or more opposing force points of contact is a form of grasping. "Grasp" is not a defined term in Game Manual Parts 1 & 2. As a reminder, section 4.5 of Game Manual Part 2 states that the official FIRST Tech Challenge Q&A Forum rulings take precedence over all information in the game manuals.

(Asked by 5237 answer published at October 8th 2022)

Q56 Clarification over a V-Shaped Groove

**Q:** Questions 26 and 49 seem to prohibit driving into a Junction Pole with a V-shaped groove since there are two points of contact between the robot and Junction. A) Would a "U" shaped groove that has 1 point of contact against the Junction be allowed? "Possess/Possessing" mentions how a robot could "move forward, turn, back up, spin in place" and still hold an object in relative place. B) Since a V-shaped groove would lose contact with the Junction when backing up, would it not be Possessing?

**A:** Answer A: It depends on the dimensions of the "U" shaped apparatus and how it is used in gameplay. The referee crew watching how the Robot interacts with the Junction pole during Match play will make this determination. It is not possible to provide an absolute ruling in the game Q&A forum.

Note: This is not an invitation to provide a detailed drawing of the Robot apparatus for review. The Q&A Game Forum does not rule in specific Robot designs.

Answer B: The defined term "Possess/Possessing" is not relevant to the "Robots Grasping Game Elements" rule G25.
Q69 Does intent matter with updated definition of grasping per Q26, 49 and 56

Q:  
If an opening or protrusion unintentionally and inconsequentially interacts with a junction pole creating at least 2 planes of contact, should a grasping penalty be called? 1) A team has a robot with an open wheel base, as suggested in the FTC robot build resources. A wheel and the frame catch on the junction pole. 2) An opening for intaking cones accidentally contacts the pole on 2 surfaces while attempting to place a cone. 3) Contact occurs on 2 planes because the pole isn’t fully vertical.

A:  
The Game Design Committee cannot comment absolutely on these scenarios. The ultimate decision would be determined by the referee at your event, with the final call made by the Head referee.

Answers 1 & 2: The referee crew is unlikely to view this type of interaction as violating rule G25, provided that it is clear that the Robot is not using this interaction as a gameplay strategy or as an aid for Scoring.

Answer 3: There are no rule G25 exceptions for a Junction pole that is not “fully vertical”.

Q89 Cone Stack Q64 Q67

Q:  
In the answer to Q64 & Q67, you said that trapping is a form of control. We were considering adding a V or U-shaped guide to help align our intake to the top of the cone, not to push or pin the stack against the wall. If this guide comes in contact with the stack of our alliance cones in order to pick up the top cone, is that considered possessing the entire stack of cones?

A:  
The scenario described in the question is allowed.

Q94 How much junction pole movement qualifies as tipping?

Q:  
How much does the top of a terminal pole have to move in order to be considered tipping? Is tipping any and all visible movement, or a movement from vertical that does not return to vertical? Ex.1 If a robot unintentionally bumps into a junction pole while driving and the top of the pole wobbles, is that a tipping penalty? 2. While scoring a cone on a pole, if the cone causes the pole to wobble and return to vertical while the robot controls the cone, is that tipping?

A:  
Rule G26 constraints for tipping do not apply to Junction poles. The pole/spring assembly is designed to allow tipping as part of normal gameplay.  
Note: Rule G26 constraints for destruction, damage, and entanglement do apply to Junction poles.

Q95 Clarification around <GS8>, Q10, and the wording "impede or obstruct"

Q:  
In the most recent manual update, and also in Q10, the words “impede or obstruct” replace “Block” in parts of <GS8>. Because the new words are not capitalized, there is no formal definition of them. A) Could a formal definition be provided for these new words? B) Additionally, do these protections from <GS8> apply to cones below the upper edge of the junction but still In the vertical plane of the Junction Zone?

A:  
Answer A: Use the dictionary meaning of words that do not appear in the game definitions section (4.3) of the Game Manual Part 2. 
Answer B: I don’t understand what is being described by the text “below the upper edge of the Junction.” The Junction Area is shown in Appendix C, illustration C-8. The vertical boundary of the Junction Area extends upwards to infinity. Rule GS8a and GS8c protections come into play when the Scoring Element is In the Junction Area.

Q106 Indirect Cone Contact through Wall

Q:  
Suppose a robot hits the wall, shaking the wall, and the shaking of the wall knocks over the opposing Alliance's preplaced stack of cones sitting against the wall. Would this count as a penalty under <GS6>, which bans knocking over the opposing Alliance's cones?

A:  
Yes, knocking over the opposing Alliance's Cones in this scenario violates rule GS6b.

Q111 Human Player position in drivers box

Q:  
May the human player 1) sit down in the drivers box so they are out of the way of drivers vision, 2) may they step/sit outside the drivers box boundaries when delivering cones? The edge of the drivers box is 18 inches from the field, so it's a long stretch to place cones if they can't exit the drivers box.
Q: Is it legal to hold one and touch another cone?

A: The answer that you seek is found by reading rule GS6a and the definitions of "Control" and "Possess" in section 4.3 of Game Manual Part 2. Rule GS6a states that a Robot may Control or Possess a maximum of one (1) corresponding Alliance Cone and one (1) corresponding Alliance Beacon at a time. An understanding of the game definitions of the terms "Control" and "Possess" is necessary to apply rule GS6a to gameplay.

Example 1: If only one surface of the stationary Robot contacts the second Cone, it is unlikely that the Cone counts as being Controlled or Possessed, provided that the second Cone is not Trapped (a form of Control). Example 2: A Cone inside a Robot mechanism will likely be viewed by a referee as being Possessed. Example 3: If there is a Cone in each of the intake and outtake mechanisms (2 Cones total), a referee is likely to count both Cones as being Possessed and apply rule GS6a consequences.

Note: Keep in mind that Trapping a Cone against the Playing Field Wall, a Game Element, or Robot is a form of Control. This is relevant if the second Cone in the described scenario is part of a pre-Match positioned Cone Stack. It is likely that a Robot touching/pressing a Cone Stack against the Playing Field Wall will be viewed as Trapping.

Q: Clarification about Scoring Areas for rule G6

A: Rule G6 says "Scoring Elements in a Scoring Area that are in contact with or Controlled by a Robot on the corresponding Alliance for the Scoring Area have zero Score value". From what I see in Game Definitions, the only Scoring Areas are the Terminals. Q1: Do the Junctions/Junction Areas count as Scoring Areas for the purpose of rule G6? Q2: Does a robot touching cones scored on a junction zero the score for them? Q3: Does this rule only apply to alliance-specific areas and not to junctions?

A: Answer 1: Yes.

Answer 2: Yes, if the Cone color matches the Robot's Alliance.

Answer 3: No.

A Cone or Beacon touching a corresponding Alliance Robot at the end of a Match period has zero Score value.

Example: A red Alliance Robot is touching a red Secured Cone on a Junction at the end of the Match. This red Cone has zero Score value and the Cone does not convey/affect Junction Ownership.

Q: Does a claw with a bigger hole than Junction pole considered as grasping?

A: We want to design a claw with a bigger hole diameter than the Junction pole, such as 1.5". When the claw closed onto a Junction pole, the hole looped the Junction pole. Since the Junction pole is 1" diameter, the claw has maximum 1 point contact the Junction pole, and no opposing force to the Junction pole. This sounds like allowed according to Q&A26 grasping definition. But we still would like to ensure it is legal. Thank you!

A: The Robot claw design described in the question violates rule G25 because the Robot effectively has a hold on the Junction Pole. If the Robot were to move in any direction while the claw encircles a Junction Pole, the Junction Pole will follow the Robot's movement.

Q: G29 intent- junction/cone sensors

A: According to <G29> "Robots may not deliberately use Game Elements to ease or amplify the difficulty of any Scoring or game activity." Q: Are we able to "use" sensors to detect cone/junction proximity in order to introduce some level of scoring automation to driving? (i.e. Limit switch senses cone then shuts claw & lifts arm, different limit switch hits junction & scores cone) In the past using sensors to interact with the field have been encouraged, however this rule seems to do the opposite.
Yes. Rule G29 is not intended to limit Robot sensor use while interacting with Game Elements.

(Asked by 4813 answer published at November 15th 2022)

Q152 Knocking Over Own Alliance Cone Stack

Q: Rule GS6 e) ii Knocking over your own stack of unscored Cones is allowed. Are the following actions/scenarios allowed? 1) Can a robot knock over any portion of the unscored Cone stack while attempting to grasp the top cone to possess the cone? 2) Can a robot knock over the unscored Cone stack while possessing another Cone legally? Thank you for your consideration. Team 3123

A: Answer 1: Yes
Answer 2: Yes

(Asked by 3123 answer published at November 16th 2022)

Q161 Simultaneous robot and controlled element contact

Q: If our robot has one point of contact on a junction pole, and a cone that we are controlling is also making contact on a different face, would that be considered grasping? Ex. Our robot is pushing a pole at an angle of about 5 degrees from vertical from the front, and a cone we're placing on the pole is touching the back of the pole.

A: The Robot's actions described in this scenario are not Grasping.

Note: However, a Robot using a Possessed Cone to tip over a Junction Pole beyond what is necessary to Score is effectively holding the Junction Pole and is likely to be viewed as Grasping by the referee crew.

(Asked by 10464 answer published at November 22nd 2022)

Q177 Plowing of unscored upright cone stack Penalty Exception GS6.e.iii

Q: Ref: PLOWING, GS6.b, GS6.e.iii Is inadvertent contact with the opposing Alliance's unscored stack of cones that does NOT result in the stack of cones being knocked over, but instead moves the opposing Alliance’s upright stack of cones relative to the motion of the robot, an allowed action by the PLOWING exception stated in GS6.e.iii?

A: The Robot's actions described in the question violate rule GS6.b for Controlling the opposing Alliance’s Cones.

The rule GS6.e.iii exception for "Plowing any quantity of either Alliance’s Scoring Elements" is intended to cover the situation of randomly placed Cones on the Playing Field Floor not the pre-placed starter stacks of Cones that are in a known location on the Playing Field.

(Asked by 11354 answer published at November 23rd 2022)

Q184 Clarification on Blocking

Q: In Game Manual 2, Blocking is defined as: "Preventing an opposing Alliance Robot from accessing an Area or Game Element for an extended period by obstructing ALL paths of travel to the object or Area." However, does a "path of travel" have to a full 18 inches for any robot or simply big enough for most or that particular robot to travel through?

A: In the context of the defined term Block and rule G28, "path of travel" can be described as an accessible and unobstructed route. The necessary width of an unobstructed path is dependent upon the width of the Robot in question. For example, an unobstructed path for an 18 inch wide Robot is greater than an unobstructed path width for an 14 inch wide Robot.

(Asked by 21336 answer published at November 29th 2022)

Q193 Opposing Alliance Cone and/or Beacon stuck in robot.

Q: If a red alliance robot was driving and a blue alliance robot accidentally dropped a cone into the red alliance robot, would the red alliance robot incur a penalty every time they have more than one cone in possession and if they score with the extra possessed cone?

A: The rules that apply to this scenario are GS6.b for the opposing Alliance Cone, rule GS6.c for the opposing Alliance Beacon and rule GS6.d for Scoring a Cone or Beacon while i Control or Possession of more than the allowed quantity of Scoring Elements*. Due to the expected gameplay for the POWERPLAY season, the Game Design Committee decided for this scenario to use rule G3 to protect the Red Alliance Robot from rule GS6.b, GS6.c, and GS6.d Penalties. If a Robot accidentally or intentionally drops their Alliance’s Cone and/or Beacon into an opposing Alliance Robot, the opposing Alliance Rot is protected form receiving the previously referenced rule GS6 Penalties.

(Asked by 130 answer published at December 1st 2022)

https://ftc-qa.firstinspires.org/admin/report
Q196 May a Robot contact two different junction poles at the same time?

Q: Is a robot allowed to contact 2 different junction poles at the same time?

A: Yes.

(Asked by 15358 answer published at December 5th 2022)

Q204 Moving the Cone Stack Clarification

Q: A robot moved the Cone Stack accidentally away from the wall (about 2in) when its mechanism was stuck on the top cone. They were assessed 4 minor penalties for this action. There a movement tolerance before a rule GS6 violation for controlling too many cones occurs?

A: For the Cone stacks only, the Game Design Committee rules that movement of one inch or less is inconsequential and therefore, does not violate rule GS6. The one (1) inch (2.5 cm) distance standard for inconsequential Cone stack movement does not apply to any other determinations of consequential or inconsequential gameplay.

A referee located in their normal location outside the Playing Field Wall will use their judgement to make a real time estimate of the amount of Cone stack movement. The Referee should not enter the Playing Field nor attempt to measure the Cone stack movement.

The "Cone stacks" referenced in this ruling are identified in Game Manual Part 2 Figure 4.2-1.

Note: The intent of this ruling is to avoid unintended rule GS6 Penalties for a small movement of a Cone stack caused by a Robot that is simply playing the game (i.e., removing the top Cone from the stack). This ruling does not allow gameplay actions or strategies that incrementally move the Cone stack to a more desirable location.

(Asked by 5155 answer published at December 6th 2022)

Q210 GS6 Blocking clarification - How Is it possible to "trap" your own scoring element? Q120

Q: GS6a states that robots may control or possess a maximum of one cone and one beacon. In the definition of control, example "d" states that "Trapping" one or more scoring elements against a game element, wall, or robot. But the definition of Trapping deals with preventing an opposing alliance from escaping a constrained area. Scoring elements are not part of trapping or are they? Please clarify how trapping as defined relates to GS6a. Q120 also hints at this.

A: Thank you for bringing this to our attention. Your observation is correct, there is an inconsistency in how we apply the defined term Trap to Robots and Scoring Elements in Game Manual Part 2.

For the POWERPLAY game, example "d" in the defined term Control/Controlling is changed to:

d) Confining one or more Scoring Elements against a Game Element, Playing Field Wall, or Robot to shield or guard them.

(Asked by 14835 answer published at December 8th 2022)

Q214 Related penalties for descoring/tipping a junction

Q: Q6 clarifies that it is legal for an Alliance to descore their own cone. The penalty for descoring an opponent's cone is clear. If a team unintentionally tips the high junction in front of their own substation containing 10+ cones, and the pole falls toward their own substation but does not completely block access to any area of the field. Would there be any penalties assessed for the field obstruction caused by the fallen pole/cones (or any other less-obvious penalties?)

A: We believe Q14 (qa/14) and Q58 (qa/58) answers the de-scoring portion of your question.

If the referee crew believes the Robot's actions that caused the Junction pole to tip over were "unintentional" and the Junction pole "does not completely Block access to any Area of the Playing Field", it is likely that there will be no Penalties for the tipped over Junction pole.

However, the consequences of "Playing Field obstruction" caused by a tipped over Junction pole would be determined by the actions of the opposing Alliance Robot(s) (did they attempt to access an obstructed Area?) and the possible application of rules G10, G28, and G29.

(Asked by 19746 answer published at December 8th 2022)

Q222 Further clarification on the passive deposit mechanism and junction bending angle

Q: In Q161, the team said their robot is pushing the junction pole at an angle of about 5 degrees. It is ruled legal. Can GDC further define "What is necessary to Score"? Can the team use either their robot element or cone to push the pole at 10, 20, or 30 degrees? Is it up to the referee to decide at the particular event? There won't be any ruling consistency cross events. Legally bending the pole at a larger angle even with one point of contact in autonomous will definitely have an advantage.

A:
While we understand the wish for a simple metric, we believe that there is no "one size fits all" type of definition that is reasonable. The definition of "what is necessary to score" depends very much on the robot, the skill of the drivers and the other factors on the field at the time of the scoring.

Teams that deflect poles repeatedly and significantly should expect additional scrutiny. Deflection that is deemed excessive (either in angle or duration) will likely cause discussion about either G25 Grasping or G29 Illegal Use of Game Elements violations.

(Asked by 12611 answer published at December 15th 2022)

**Q223 Can Teams ask to view a match score sheet?**

**Q:** Can teams ask to view a match score sheet after a match in which they were part of an alliance in a traditional event?

**A:**
The answer that you seek is found by reading rule C02 in Game Manual Part 1.

Rule C02 states in part: "All questions about a Match or scores must be brought forward to the referees by using the referee question box located in the Competition Area. Please read the entire rule to gain an complete understanding of how and when to ask the Head Referee questions about a Match.

(Asked by 12825 answer published at December 12th 2022)

**Q234 V-guide bar touching cone on junction**

**Q:** As an add on to Q49, we have a v-guide that helps us to grasp our cone more quickly. If that v-guide makes contact with a cone that has previously been placed on a junction, is that considered grasping?

**A:**
In general, a "V" shaped Robot device interacting with a Game Element is a form of grasping. The following are a few examples of legal and illegal "V" shaped device interactions with "Game Elements".

1) A "V" shaped guide to help the Robot grasp a Cone is allowed.
2) A "V" shaped guide to directly interact with a Junction Pole is grasping and is therefore not allowed per rule G25.
3) A "V" shaped guide that contacts a previously Scored Cone on a Junction Pole causing insignificant Junction Pole movement is allowed.
4) A "V" shaped guide that contacts a previously Scored Cone on a Ground Junction is allowed Bracing.
5) A "V" shaped guide that contacts a previously Scored Cone on a Junction Pole causing significant Junction Pole movement is effectively grasping the Junction Pole and is therefore not allowed per rule G25.

(Asked by 12978 answer published at December 19th 2022)

**Q249 At what height do game elements no longer score on the small pole?**

**Q:**
Last competition, our team stacked 7 cones onto a small pole. The opposing alliance, in end game, took an 8th cone with a beacon on top and capped our stack of cones, making the pole not visible. Q1: Is there a limit on how high you can stack? Q2: Should beacons on top of cones be allowed if they are not touching the pole? Q3: The definition of "on" says that they should touch at least partially. Would you score the beacon, the cone, or any of it?

**A:**
Answer 1: No

Answer 2: Yes. There is no requirement for a Capped Beacon to touch the Junction Pole. The Beacon in this scenario satisfies condition "b" in the definition of Cap/Capping in section 4.3 of Game Manual Part 2.

Answer 3: The opposing Alliance Cone and Beacon should count as Scored based on the scenario described at the beginning of the questions.

(Asked by 20012 answer published at December 23rd 2022)

**Q258 Q64, Q67, Q89, Q204 clarification - Interacting with Cone Stack**

**Q:**
Q64 gives clarification to the fact that we can't have the cones trapped and be scoring at the same time. Q67 gives clarification to the fact that trapping is not allowed even when not scoring Q89 gives clarification to the fact that interfacing with the top cone only is not considered trapping. Q204 gives additional guidance on the ruling of less than 1" of movement not violating GS6. So if we interface with the bottom cone of the cone stack moving it less than 1" can we pick up the top cone?

**A:**
We are not able to answer this question absolutely because the term "interface" used in the question is open to interpretation. "Interface" could be touching, Grasping, enclosing, etc. A few examples of illegal and legal "interfacing" with the bottom Cone are:

1) Grasping the bottom Cone while "picking up" the top Cone violates rule GS6.a.
2) Touching the bottom Cone with a single point of contact without Trapping the Cone Stack while "picking up" the top Cone is allowed.

Feel free to ask a follow-up question that contains more detail about the scenario.

(Asked by 14204 answer published at January 5th 2023)
Q263 Are hanging cones counted?

Q: Does the cone that is hanging on the top of the pole count as On/Completely On?

A: A Cone that is hanging on the top of a Junction Pole counts as Completely On the pole if it is not contacting any other object. The Cone is On the pole if it is Supported by the pole and another object.

Bonus Question: Does the Cone in this scenario count as Scored?

Bonus Answer: No, the Cone must be Secured in a Junction for it to be counted as Scored. The definition of Secured in section 4.3 of Game Manual Part 2 states in part that "A Cone is Secured in a Low, Medium, or High Junction when the pole passes through the 1.25" diameter hole of the Cone or it is Completely On a Secured Cone."

(Asked by 20012 answer published at January 9th 2023)

Q277 Coach breaking vertical plane of the playing field wall by pointing.

Q: If an alliance coach points and breaks the vertical plane of the field wall to give directions to his/her driver team during match play, is that legal?

A: No, rule G16 requires the Drive Team to remain In their Alliance Station. The orange box for this rule specifically states that reaching into the Playing Field is not allowed.

(Asked by 12825 answer published at January 19th 2023)

Q278 Robot Setup Alignment

Q: <G15> is unambiguous. Unfortunately, we found discrepancies in delivering the pre-loaded cone in a match field consistently. We were assigned Red Right on Fld 2 and on both occasions the robot failed to deliver to the nearest Low Junction in an identical manner. During Field Inspection, the FTA was kind enough to permit a quick test (coincidentally fro Red Right) on Fld 1. The test was successful. After reviewing <G8> & <G12>, we respectfully ask whether we can use a plastic plate to align?

A: Yes, subject to the requirements specified in rule G15. The plastic plate must be part of the Robot and remain attached to the Robot at all times. Keep in mind that the use of Rob set up alignment tools must not interfere with another Drive Team's Robot setup nor unnecessarily delay the beginning of a Match.

Note: The Drive Teams on an Alliance are encouraged to discuss Robot pre-Match set up locations and gameplay strategy while they are together in the queue. Drive Teams on an Alliance may decide where each Robot is set up for their Match. The Alliance Station position assignments on the qualification Match schedule are only used if the Alliance partners are not able to agree on the locations.

(Asked by 18738 answer published at January 16th 2023)

Q281 Two parallel sticks to align junctions

Q: If a bot has two actuated thin sticks or dowels that rotate towards each other in a gripping/closing motion and are used to align the top of the junction in a position where they are ~1.5-2" apart and parallel, so that only one can ever make contact with the junction, and that the junction itself is halfway down the length of the two sticks (ex. 5" forwards and 5" backwards), is it considered grasping the pole and is this situation legal, considering there is only one point of contact at a time?

A: A single point of Robot contact with a Junction pole is not illegal grabbing of a Game Element.

The description of the Robot appendage appears to prevent it from grabbing a Junction pole. However, the minimal pole clearance between the two dowels may be difficult for the referee crew to see during gameplay and lead to the application of rule G25 consequences. Demonstrating to the referee crew how the Robot interacts with the Junction pole before the first qualification match of the day is recommended.

(Asked by 5356 answer published at January 19th 2023)

Q283 Does Q204 Supersedes GM2 GS6e(ii) and Q152? Can we knock over the ConeStack in Autonomous?

Q: According to GM2 GS6e(ii) and Q152, knocking over our alliance's Cone Stack does not violate GS6. However, Q204 appears to supersedes this by imposing a 1 inch stack movement limit. Our autonomous strategy relies upon controllably knocking over the stack without Grasping any cones, which was legal when we wrote the autonomous and designed the intake mechanism because of GS6e(ii) and Q152 (this was before Q204). Does our strategy of knocking over the stack violate GS6 in light of Q204?

A: The one (1) inch movement guidance provided in Q204 (0ar/204) applies to an upright Cone stack. Knocking over an Alliance's own Cone stack is allowed.

(Asked by 16460 answer published at January 19th 2023)

Q285 Parking Clarification

Q:
Whenever parking in the Terminal or Substation, does the robot have to be touching the field tile within the taped area or is it a a 3-dimensional plane?

A: The Navigating Scoring achievement does not require the Robot to contact a Playing Field Tile inside the Scoring Area.

The Navigating Scoring achievement requires the Robot to be In the Scoring Area. The defined term "In" is an "object that has crossed into the upwards vertical extension of a defined Area's boundary." A Robot extending into a Scoring Area satisfies the requirement to be "In" the Area.

(Asked by 13948 answer published at January 19th 2023)

Q288 Arc shaped Junction guide.

Q: Question 1: If junction pole touches an arc shaped apparatus with a radius much greater than radius of the pole, would that be considered grasping according to rule G25?
Question 2: At any given time, there is only one point of contact with the pole. When our robot moves in a lateral direction, the pole does not follow the path of our robot. Would that apparatus be legal? https://photos.app.goo.gl/gaGhGCpT4WX2fPY6

A: Answer 1: No, provided that the radius of the arc shaped apparatus is greater than the radius of the base of a Cone.
Answer 2: The Robot apparatus shown in the photo may legally interact with a Junction pole if the radius of the Robot's apparatus is greater than the radius of the base of a Cone.

(Asked by 13356 answer published at January 24th 2023)

Q293 Moving Cone Stack Back and Forth

Q: In Q204 it says: "For the Cone stacks only, the Game Design Committee rules that movement of one inch or less is inconsequential and therefore, does not violate rule GS6." At an event the head referee told us that if we move the cone stack 1/2" when interact with it and then move it back 1/2" when we interact with it again later that we have violated the 1" rule. Can you further clarify this?

A: Rule GS6.a consequences for moving the Alliance's Cone stack are applied when the position of an upright Cone stack has moved to a location that is more than one (1) inch from its pre-Match set up starting location.

Moving the Cone stack 1/2 inch away from its starting location and in a separate interaction, moving the Cone stack 1/2 inch back to its pre-Match set up starting location has maintained the Cone stack within the one (1) inch movement allowance. Therefore, this scenario is not a rule GS6.a violation per Q204 /qa/204).

Note: A Robot that moves its Alliance's Cone stack more than one (1) inch from its pre-Match starting location in a single or cumulative movements violates rule GS6a. Once a referee assigns a rule GS6 Penalty, moving the Cone stack back to its pre-Match starting location does not undo (i.e., reverse) the previously applied Penalty.

(Asked by 288 answer published at January 23rd 2023)

Q296 Number of Penalties for Moving Stack

Q: A robot that is not in possession of a cone pushes its alliance's stack of 5 cones more than 1 inch from its pre-match starting location and then stops. How is rule GS6 applied to this scenario?

A: Rule GS6.a allows a Robot to Control or Possess one Cone. In this scenario, the Robot legally Controls one (1) Cone and illegally Controls four (4) Cones. The Robot should receive an immediate four (4) Minor Penalties for violating rule GS6.a.

(Asked by 14393 answer published at January 23rd 2023)

Q302 Is the spring that the poles are mounted part of the junction?

Q: Question 1: Is the spring that the poles are mounted considered part of the junction? Question 2: If not so, is it legal to "grasp" the spring. Pushing against the spring does not seem to change the angles of the poles.

A: Answer 1: Yes
Answer 2: Grasping the Junction pole spring is not allowed per rule G25.

(Asked by 4327 answer published at January 25th 2023)

Q311 Center Line in Autonomous

Q: In a match, the lift on a blue robot fell off while attempting to score on a centerline junction in autonomous, and landed as seen in this picture: https://tinyurl.com/gs3rq The red robot hit the lift on the blue robot and was thrown off course by the interaction. The head referee was unsure if the blue alliance should have received a GS3 penalty. How wide is the centerline? It would be good to have a clear centerline area so referees and teams know where autonomous interactions will violate GS3

A: We cannot comment absolutely this scenario. The ultimate decision would be determined by the referee at your event, with the final call made by the Head referee.
It is difficult, if not impossible to make a correct determination by viewing a photo of a limited portion of the Playing Field. Robot actions leading up to the point in time that this photo was taken may also impact how the referee crew applies the appropriate rules.

Based on the limited text description of the Robot actions, per rule GS3, no Penalty should be assessed because the Robots interactions occurred at the centerline Junctions.

The referee crew will use the dictionary definition of “centerline” when applying rule GS3 to Autonomous Period gameplay.

Note: Teams that make use of Autonomous Period gameplay strategies that include Robot navigation near the centerline Junctions risk incurring allowed disruptions caused by other Robots that are simply playing the game in the same part of the Playing Field.

(Asked by 19458 answer published at January 30th 2023)

Q315 Follow up to Q288 on Arc shaped Junction guides

Q:
In Q288 it is stated that a robot apparatus interacting with a junction pole must have a radius larger than the base of a cone in order to not be considered grasping. Unclear is a situation where the robot apparatus never brakes a cone and only interacts with a pole: 1) Would an arc shaped apparatus with a 3" diameter, which under no circumstances can touch a pole at more than one point, and at any given moment is not contacting a cone, be legal? 2) If not, what rule does this violate and why?

A:
We believe [Q288 (qa288)] answers your question. If it does not, please rephrase your question and resubmit.

For the POWERPLAY game, the Game Design Committee selected the Cone radius as a measuring tool for determining if a curved robot part can legally contact (i.e., without grasping) a Junction pole because a Cone is readily available to Teams, robot inspectors, and referees.

Answer 1: An single arc shaped Robot apparatus that has a radius greater than the radius of a Cone is declared by the Game Design Committee to be unable to grasp the Junction pole and therefore does not violate rule G25 when it contacts a Junction pole.

The definition of Cone in section 4.3 of Game Manual Part 2 states that the diameter of the Cone base is four (4) inches. The radius of the Cone base is therefore two (2) inches. Robot apparatus with a radius greater than two (2) inches is deemed to be unable to grasp the Junction pole. A Robot apparatus with a two (2) inch or smaller radius that contacts a Junction is grasping and violates rule G25.

The Robot described in this question with a three (3) inch diameter (1.5 inch radius) apparatus violates rule G25 when it contacts a Junction pole.

Answer 2: Rule G25 is violated for the reasons specified in Answer #1 above.

(Asked by 16379 answer published at January 31st 2023)

Q318 Clarification and Implications of the Q315 and Q288 2" Radius Minimum

Q:
With the flood of questions about legal Junction contact, it makes sense to have an easy metric. However, many teams have passive scoring mechanisms that work only because arc greater than the diameter of a Junction can be less than the radius of a Cone. A) Are teams expected to completely redesign their scoring mechanism to accommodate this rule change? B) Could a smaller radius (IE the top of the cone) be used? C) if A, will there be a grace period for teams to redesign?

A:
Answer A: Yes, Robot contact with a Junction pole with an arc shaped appendage that has a radius less than or equal to a Cone base violates rule G25.

Answer B: No.

Answer C: Yes, enforcement of the guidance provided in post [Q288 (qa288)] starts on Thursday, February 16, 2023.

(Asked by 16379 answer published at February 2nd 2023)

Q319 Further clarification on Q318 grace period

Q:
Regarding Q315 and Q318, we need clarification on what's legal during the grace period before 2/16, especially for teams competing this weekend: 1. Between now and 2/16, is single arc shaped Robot apparatus with radius greater than 2 inches legal? 2. Between now and 2/16, is a single arc shaped Robot apparatus with radius less than 2 inches legal? 3. Between now and 2/16, is a 90-degree V-shaped apparatus where the vertex of the V is replaced with a 90-degree arc with radius 1.5 inches legal?

A:
Answer 1: Yes, as well as after 2/16/2023.

Answer 2: Yes.

Answer 3: No, the intent of the grace period is to allow time for Teams to change their designs. It is not intended to allow interim new designs that violate rules and related guidance provided in this forum.

(Asked by 8644 answer published at February 7th 2023)

Q320 GS12 warnings are per-match or per-competition?

Q:
There are several rules that provide an initial Warning for the first violation. Most clarify if the Warning is afforded per competition (i.e., <G11>, <G22>, <G23>, <G25>) or per mat (i.e., <G16>b), but <GS12> doesn't. Is the Warning for the first violation of <GS12> afforded per competition or per match?
A:
The warning is per match.

Teams should be aware that repeated violations of GS12 (even just to the level of initial warnings) across multiple matches may be viewed as intentional rule violations and could be subject to G30 consequences

(Asked by 7172 answer published at February 8th 2023)

Q334 Limits on deflecting junction while depositing cones

Q:
Q49 & Q129 indicated that deflecting the pole while scoring was not an infraction of G29. Since then we have seen Q161 and Q222 which state that deflection of the pole is limited to "what is necessary to score" however this puts it up to the local referees. Our local referees are asking us to get clarification here such that it is clear and publicly available to a team.

Q1: We have been told that if we deflect the pole outside the cylinder defined by the washer it is a violation of G29?

A:
We believe [Q222 (qa/222)] answers your question.

Answer 1: Per [Q222 (qa/222)], while we understand the wish for a simple metric, we believe that there is no "one size fits all type of definition that is reasonable.

The definition of "what is necessary to score" depends very much on the robot, the skill of the drivers and the other factors on the field at the time of the scoring.

Using the pole deflection "outside the cylinder defined by the washer" is not a valid one size fits all metric for determining the legality of a deflected Junction pole.

(Asked by 14204 answer published at February 7th 2023)

Q336 End-of-match scoring for a robot disabled due to failure

Q:
Question 1: If a robot is disabled due to robot failure (not by the referee), can their alliance partner move the robot into a scoring position? (For example, pushing the robot into the alliance terminal before the end of the match.) This seems to be implied by G7. Question 2: Would the disabled robot still score for their alliance if the opposing alliance moved them into a scoring position?

A:
Answer 1: Yes, a nonfunctional Robot that has not been declared to be Disabled by a referee is eligible to earn points. Moving/pushing an Alliance Partner Robot is generally allowed.

Answer 2: A nonfunctional Robot that has not been declared to be Disabled by a referee is eligible to earn points. How the Robot ended up in a Scoring Area does not affect its Score value. There is not a rule that specifically prevents a Robot from pushing a nonfunctional opposing Alliance Robot. Keep in mind that rule G26 address the consequences if the destruction, damage, tipping, or entanglement of an opposing Alliance Robot. Depending on the circumstances of the Robot interaction, safety rule S1 may also come into play if the other Robot is damaged.

Note: Rule G7 states that if a referee Disables a Robot, it will not be eligible to Score or earn points for the remainder of the Match.

(Asked by 16461 answer published at February 9th 2023)

Q345 Touching the junction in a single plane but not with a 'arc' apparatus

Q:
With the updated guidance on the arc radius of 2" there are also other ways to assist with scoring. One we have seen is with parallel 'rods' that extend out forward (parallel to each other) from the robot to ensure verticality of the junction. On the robots we have seen so far, they are spaced such that it is impossible for a junction to be in contact with both at the same time. Essentially it would be touching the left of the right rod only. Would a 2" spacing be acceptable for these rods?

A:
We believe [Q281 (qa/281)] answers your question. If it does not, please rephrase your question and resubmit.

(Asked by 9225 answer published at February 13th 2023)

Q348 Follow up to Q26, Grasping a junction

Q:
In Q26, it was qualified with "intent to limit its (the junction) motion". Our claw mechanism will lower the cone onto the junction, then open to drop the cone the rest of the way. If we close the claw before we completely lift back up above the junction, then our claw will technically close around the junction. The intention was not to "limit motion", it was just inadvertent game play after scoring an element. Is this a violation of G25?

A:
The answer depends upon what the Robot's actions after closing the claw around the Junction pole.

1) The Robot's closed claw does not contact the Junction pole; Rule G25 is not violated because grasping requires contact with the object.

2) The Robot's closed claw contacts the Junction pole; A closed Robot claw contacting the Junction pole is grasping. The referee crew will determine if rule G25 is violated and apply the appropriate consequences. The referee crew will likely excuse a Robot's careful attempt to withdraw the claw without grasping, provided that there is negligible movement of the Junction pole and the Junction pole is not damaged.

Example Scenarios: a) Rule G25 is not violated if the Robot opens the claw and backs away without contacting the Junction pole.

b) Rule G25 is not violated if the Robot raises the closed claw so that it is clear of the Junction pole without contacting the Junction pole before the Robot moves away from the Junction.

https://ftc-qa.firstinspires.org/admin/report
Q: Rule G25 is violated if the Robot backs away and the closed claw contacts the Junction pole. The referee crew may choose to use rule G10 to excuse this violation if they view the Robot's interaction with the Junction pole as being inadvertent and inconsequential. A Robot that usually interacts with the Junction in this manner should not be deemed to be inadvertently grasping and shall be Penalized for violating rule G25.

(Assigned by 11093 answer published at February 14th 2023)

Q: Is the game mechanism for interacting with the junction a design legal mechanism? Could you provide a similar metric for collecting the stack?

A: Answers 1 and 2: The guidance provided in [Q288](/qa/288) was provided because Robots are not allowed to grasp a Junction pole per rule G25. A “similar metric” for the Cone Stack is not necessary because Robots are allowed to grasp a Cone.

Answer 3: Provided that the Robot does not pin the Cone Stack against the Playing Field Wall while a Cone is removed from the stack and Cone Stack movement is less than one (1) inch as described in [Q204](/qa/204).

(Assigned by 12833 answer published at February 20th 2023)

Q: Game Manual 4.3; following Q. 315

Q: Forum question 315 says that for an arc-shaped aligner, which we imply means a sector of a CIRCLE, the radius must be at least 2 inches. New Question: Does the 2-inch-plus radius rule apply to an aligner elliptical or parabolic in shape, where the arc gets narrower as one approaches the ‘vertex’ or center point of the aligner? In other words, does the 2 inch-minimum rule apply to all curves of the aligner’s arc or only to the aligner’s overall width?

A: Answer: The smallest radius in the arc-shaped Junction pole aligner must be 2-inches or larger.

(Assigned by 12589 answer published at February 20th 2023)

Q: Alliance Signals Readiness but then Discovers Driver Hub has Disconnected

Q: Our team's Driver Hub went offline immediately after our Alliance jointly signaled readiness to the Head Referee. Since the team rightly understood that no buttons can be pressed to restart the connection it simply waited out the Autonomous period. The Head Referee had not started his 3-2-1-go chant. Since re-randomization is an option, could the team have alerted the Head Referee to their predicament and requested a fallback state to pre-randomization state?

A: Yes, the recommended action at this point time in the match play sequence is to alert the referee crew. The Head Referee will decide how to proceed.

Note: This is a great question. The Drive Team should immediately notify field personnel whenever there is a technical problem with their Robot, Robot Wi-Fi communication, Drive Station, etc. Even when the Drive Team knows how to remediate the problem at hand, it is in the Team's best interest to alert field personnel. An experienced FIRST Technical Advisor (FTA), or FTA Assistant can quickly diagnose the problem and know what actions to take to get the Robot back into action. Many Robot issues can be addressed without touching the Robot. For the times during gameplay that direct interaction with the Robot is necessary, but is not allowed, the FTA or FTA Assistant can explain to the Drive Team what went wrong and how to fix the Robot after the Match.

During Pre-Match Robot set up, the field technical crew should be close at hand and available to assist teams upon request. Once the field technical crew releases the Playing Field to the referee crew, alert field personnel by loudly asking for the “FTA” and gesturing expressively with their arms and hands. This alerts both the field technical and referee crews that a Robot is in distress.

The FTA, during Pre-Match setup, has the flexibility to take extra time to address Robot issues. Once the FTA releases the playing field to the referee crew, the Head Referee has absolute control over how to proceed when Robot issues arise.

(Assigned by 18738 answer published at February 27th 2023)

Q: Legality of "Split Guide"

Q: We have created a Junction guide design that uses two separate halves to direct the Junction into the inside of an angled Cone, which functions as the center of the guide. Given that: (i) It is impossible for the Junction to contact both halves at once, (ii) The guiding surfaces of each half could be extended into a single guide with a legal radius of >2" per Q288 (iii) Using the interior of the Cone to guide the Junction is legal Is this “split guide” design legal? Diagram: tinyurl.com/Tycw2aj

A: The Game Design Committee is not confident in their understanding of the alignment appendage described in the question.

Rule G25 is not violated if only one flat panel guide at a time contacts the Junction.

Note: Keep in mind that rule G25 legality is determined during gameplay, not during Robot inspection.

(Assigned by 16460 answer published at February 28th 2023)

Q: Low Medium High Junction Scoring. Not totally touching ground
Q1: If the junction pole passes completely through the 1.25" cone opening but the cone is not in contact with the field tile due to an unscored cone or signal from any alliance holding it up, would this count as scored? Q2: If the junction pole passes completely through the 1.25" cone opening but the the cone is partially in contact with the field due to an unscored cone or signal from any alliance? Meaning the cone is not parallel with the field floor but still faces it.

A:
A Cone earns points for the corresponding Alliance when they are Secured on a Ground, Low, Medium, or High Junction. An understanding of the defined term “Secured” located in section 4.3 of Game Manual Part 2 will answer these questions.

From the Game Manual: A Cone is Secured in a Low, Medium, or High Junction when the pole passes through the 1.25 inch diameter hole of the Cone or it is Completely On a Secured Cone. A Cone is Secured only if the large opening is facing toward the Playing Field Floor.

Answer 1: Yes, the pole passes through the 1.25 inch diameter hole of the Cone and the large opening of the Cone is facing towards the Playing Field Floor.

Answer 2: Yes, if the large opening is primarily facing toward the Playing Field Floor.

Note: The original post was too near the character limit to add identifying question numbers. Related questions concerning alliance versus opposing alliance game elements were combined into fewer questions because the answers are alliance independent.

(Asked by 13948 answer published at March 7th 2023)

Q377 Knocking over a junction

Q:
If an alliance has placed a large number (more than 10) cones on a high junction and the opposing alliance bumps into the junction as causing the junction to fall over, is that considered descoring, causing a penalty for every cone on the junction? Similarly, if a junction has a large number of cones on it from from one or both alliances and an additional cone or a cap causes the junction to tip over, will the alliance that placed the last cone or cap on the junction be charged with descoring?

A:
We believe Q14 (qa/14) and Q58 (qa/58) answers your questions in part. Further information is provided below.

Answer 1: All of the Cones are descored. If the referee crew attributes the tipped Junction pole to an Alliance, that Alliance is Penalized for descoring the opposing Alliance Cone: per rule G55.a. There is no Penalty for descoring your own Alliance's Cone.

Answer 2: Yes.

(Asked by 12978 answer published at March 9th 2023)

Q378 Obstructing Shortest Path

Q:
Team A is using extending mechanisms and is obstructing the shortest path to a junction, but still provides alternate paths that are far longer and more inconvenient for Team B based on their current position. 1) Is Team B allowed to push through when Team A is not in possession of a cone knowing there will likely be contact involved? 2) What about when Team A is already in possession of a cone but the cone is not yet in a Junction Area?

A:
Answer 1: A Robot deploying “extending mechanisms” is responsible for operating safely and accepts an increased risk of becoming damaged. In this scenario, Team B is allowed to “push through”, provided that it doesn’t cause undue damage to Team A’s Robot. For example, extending a flimsy mechanism with the objective of restricting movement of an opposing Alliance Robot is likely to become damaged with no Penalty consequences applied to the opposing Alliance Robot.

Answer 2: Same as Answer 1.

(Asked by 13948 answer published at March 9th 2023)

Q379 Bumping While Attempting to Grab Cone

Q:
Robot A is partially in their substation and is trying to grab a cone from it. 1. Can an opposing robot accidentally bump the part of the robot that is outside of the substation while it trying to grab the cone? 2. Can an opposing robot intentionally bump the part of the robot that is outside of the substation while it is trying to grab the cone? In both of these instances, the opposing robot would remain entirely outside Robot A’s substation.

A:
The answer to both of these questions is no.

The Substation is a small, constrained, strategic Area that is a critical part of game flow. The intent of the Substation protection rule, GS12, is to allow Robot or Human Player access to their Alliance’s Substation as stated in this rule’s orange box. Rule GS12 consequences should be applied to the opposing [defensive] Robot in both of these scenarios

(Asked by 13948 answer published at March 13th 2023)

Q381 Robot Junction Guide that Pulls In

Q:
Many teams are currently using a guide to line up with poles that displaces them away from the robot. We assume the same applies if you are using a guide with a radius larger than that of a cone to pull the pole towards the robot? It still only contacts at one point, just coming from the other side of the pole (opposite the rest of the robot) and pulling it in closer to the robot. We see no reason why this would be illegal, it's just a different motion so I wanted to get it ruled here.

A:
Rule G25 for grasping a Game Element is applied differently for pulling versus pushing the Junction pole.

Pulling the Junction pole towards the Robot is grasping and violates rule G25.
Q386 Definition of Field Element

**Q:**
G9 says that failure of a Field Element may be cause for a replay. Field Element is not a defined term anywhere in either game manual 1 or 2. For the purposes of Match Replays what is considered a Field Element?

**A:**
Thank you for pointing this out. We merged Field Element into the definition of Game Element and overlooked updating rule G9. Rule G9 should read in part:
Matches are replayed at the discretion of the head referee only for a failure of a non-Team supplied Game Element or verified Wi-Fi interference that was likely to have impacted Match Scores for Qualification Matches or which Alliance won the Match for Elimination Matches.

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Q390 Clarification on GS8 Protection regarding Junction Guides

**Q:**
The junction area is specified as the vertical projection extending from the baseplate on pole junctions. However, with the use of mechanical aligners, the top of the pole itself is often tilted far beyond the projection. With this in mind: a) Is a robot with a cone positioned over the top of a pole but outside the junction area still protected under GS8a? b) If robot B aligns a cone within the junction area but, due to robot A's tilted scoring, not over a pole, is robot A subject to GS8a?

**A:**
Answer a: No.
Answer b: Robot A is violating rule GS8a for impeding an opposing Alliance Robot from Scoring a Cone on the Junction.

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Q391 Knocking an unsecured cone off of a junction

**Q:**
If an opposing alliance cone is sitting on top of a junction in a manner it is not secure as shown in diagram F-11 of appendix F and a robot attempts to knock it off so they can sco on that junction and the cone starts to slide down the pole in the process, but never comes to rest prior to being knocked off, would that be considered descoring? I have a short video of the scenario I'm trying to describe if that would be helpful

**A:**
Yes, the Robot in this scenario descores the Cone.
The Cone in this scenario satisfies the definition of Secured in section 4.3 of Game Manual Part 2. Removing a Secured Cone from a Junction is descoring and violates rule GS4

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Q392 Does touching a scored cone with the robot constitute a point of contact with the junction

**Q:**
The team is using a rule-compliant "funnel" device to touch a junction near the top of the junction, but occasionally the robot is also contacting a previously-scored cone on that junction at the bottom. Q1: Does that constitute 2 points of contact and hence illegal? Q2: Also could such an event be construed as possessing/controlling 2 cones?

**A:**
Answer 1: We believe Q26 (qa/26) answers your question. If it does not, please rephrase your question and resubmit.
Illegal grasping has two or more points of Robot contact that apply opposing force to a Junction pole.
The Robot in the scenario described in the question appears to have two points of contact that are not opposing each other. Therefore, the Robot is not grasping the Junction pole.
Answer 2: No, rule GS6.e.i allows a Robot to temporarily Brace Scored Cones belonging to either Alliance while placing a Scoring Element onto those Cones. The Braced Cones this Scoring scenario are not subject to the Control/Possession limit.

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Traditional - Pre-match

Q9 Can teams still use controller to configure autonomous during pre-match?

**Q:**
Last season, someone asked if a team may use controllers to configure their autonomous program after pressing init() but before randomization because of the following wording Will teams be able to configure autonomous in this way this season? 4.4.1 Pre-Match 2.e.v: Drive Teams may not touch their Driver Stations or controllers until the Autonomous Period has ended, except to start their Autonomous program with a single touch to the Driver Station Android dev

**A:**
Yes, provided that the overall Robot set up process does not unnecessarily delay the beginning of a Match (Rule G13 e)).
Q75 Aligning robot G15

Q:
I would like more clarification of the intent of G15. My understanding is that a hinged or sliding piece of robot structure can extend outside of the 18” limit to orient the robot to the correct starting position in relationship to the wall or other object. After orientation, this part is retracted to within the 18” and travels as part of the robot during the match. The tear is not allowed to use a separate alignment tool that is then removed from the field of play. Thank you for clarification.

A:
Your understanding of rule G15 is correct.

Note: The Robot alignment device and/or the alignment process may not disrupt other Teams. Rule G13e will come into play if Robot set up unnecessarily delays the beginning of a Match.

(Asked by 15689 answer published at October 26th 2022)

Q90 Game Manual 2 - G15 "Powered"

Q:
G15 in Game Manual 2 states "Robot setup alignment devices that extend outside the 18-inch starting volume constraint cannot be powered." The rule book doesn't define "powered". Is "powered" referring to robot power or mechanical power such as a spring inside of a tape measure? Thanks!

A:
A tape measure permanently attached to the Robot is an allowed set up alignment device, provided that human power extends the tape measure. The tape measure’s built-in spring mechanism is allowed to retract the tape, provided that it is done safely.

Alignment devices that extend using electrical and/or stored mechanical power are not allowed due to safety concerns.

(Asked by 7288 answer published at October 26th 2022)

Q147 Robot Configuration before auto init.

Q:
Question 1: It is our understanding that a robot can use servos to hold its 18 by 18 by 18-inch configuration during init. Question 2: In our last tournament, we were warned against pre-loading our cone outside the configuration and waiting for init to draw everything in. Is it legal to be outside the starting configuration until init, then inside the configuration afterward? Thanks!

A:
Answer 1: Your understanding is correct.

Answer 2: Yes.

The Robot’s Op Mode initialization is allowed to "draw everything [i.e., Pre-Loaded Cone] in." Keep in mind that the Driver Station init button must be pressed before the referee crew signals to the Drive Teams that Pre-Match Robot setup is complete.

Note: Rule G14 states that before the start of a Match, the Robot in its starting location must not exceed a volume of 18 inches x 18 inches x 18 inches and that a Pre-Loaded Scoring Element may extend Outside the 18-inch cube volume constraint. Therefore, there is no requirement for a Pre-Loaded Cone to be within the 18-inch cube starting volume constraint. A Pre-Loaded Cone is required to be Possessed or touched by the Robot.

(Asked by 14840 answer published at November 15th 2022)

Q159 Regarding the robot setup alignment rule G15

Q:
Regarding G15 Robot Setup Alignment, can a member of the drive team align an extending robot arm toward their signal and then move the robot toward the starting position on the wall.

A:
The setup actions described in the question are allowed because the Signal is only half a tile width away from the border of the required Robot starting location. It is unlikely that this small Robot motion will interfere with the overall pre-Match set up process.

Keep in mind that human power causes the horizontal movement of the Robot (i.e., the Robot drivetrain is not powered), there should be no Robot and/or human contact with the Signal during the alignment operation, the complete Robot set up does not unnecessarily delay the beginning of the Match (rule G13e), and it does not interfere with the set up of another Robot.

(Asked by 20182 answer published at November 22nd 2022)

Q162 Motors moving during initialization

Q:
RG02 mentions that servos can move during initialization to fit within the sizing limit. 1) What about motors? If our robot is too large before initialization, can our initialization routir power motors to make the robot fit? 2) If so, can the motors stay powered/stalling while the robot size is measured?

A:
Answer 1: Yes, provided that the same initialization process is used when setting up the Robot for a Match.

Answer 2: Yes, however, stalling a DC motor for an extended period of time such as Pre-Match set up risks damaging the motor and consuming a significant amount stored energy in the battery.
Q165 Color Calibration Before Match

Q: In the FTA Manual, a robot wiggle test is described. Would we be able to use this test to color-calibrate our camera before a match? The purpose of the calibration is to adjust for any lighting difference between the competition field lighting vs our home field/the practice field.

A: A team may calibrate their sensors during pre-Match setup if it is performed while the Robot is in its Match start location and it doesn’t unnecessarily delay the start of the Match per rule G13e.

The best time to calibrate sensors is before Match play starts during the designated time selected by the Tournament Director and/or Lead Field Inspector. See the excerpt from the Field Inspection Manual below:

Playing field lighting has a significant effect on a robot’s vision and color sensors. Teams require a brief period on each of the competition playing fields to calibrate their robot’s sensors under competition lighting conditions. Events may specify a window of time for sensor calibration or teams may have extra time during field inspection to collect sensor calibration data. The tournament director and lead field inspector will select the time for robot sensor calibration. Since sensor calibration time may vary from event to event, the time selected should be announced to teams.

Q194 Using cone to align robot before initialization

Q: In regards to G15, is it legal to use the preload cone of a robot to align it before initialization?

A: No, rule G15 states in part that setup alignment devices must be “legal components that are part of the Robot.” A Cone is not a legal Robot component per rule RM06.a.

Q298 Alliance station and Beacons

Q: Can a single team bring two beacons to the alliance station? We would like to have the option to place a beacon on a cone and score them both or have a different style beacon that can be scored by itself. We know there are penalties for one robot scoring 2 beacons, but we cannot find anywhere in the rules if an Alliance station can have more than 2 beacons in it.

A: A Drive Team should bring only one Alliance color matching Beacon to the Driver Station/Substation Storage Area.

The Game Manual Part 2 section 4.4.1 Pre-Match set up instruction for the Beacon is: "The Team's Beacon corresponding to its Alliance color is placed in Substation Storage." These instructions reference only one (1) Beacon. Multiple Beacons in Substation Storage may disrupt pre-Match checks by field personnel and hinder the referee crew during gameplay.

Q322 Pre loaded Cone touching the boundary of the mat / tile during pre-match robot set up.

Q: During pre-match robot set up, the pre loaded cone if placed on the mat (tile) next to the robot, is it ok for that cone to touch or extend beyond boundary of the current mat (tile), (Robot is within the tile boundary)?

A: Yes, rule G14 excludes pre-loaded Scoring Elements from the Robot starting configuration.

Note: Only Robots can Score. The Pre-Load Cone may not be placed in a scoring location by the Drive Team during pre-Match set up.

Q324 Can the robot use the Pre-Loaded Cone to touch the wall for startup location?

Q: Rule G14 states that "A Pre-Loaded Scoring Element may extend Outside the 18-inch cube volume constraint”. If it is in contact with the wall, does that meet the rule that "Drive Teams must place their Robot, in any orientation, touching the Playing Field Wall adjacent to their Alliance Station”?

A: No, a Cone touching the Playing Field Wall in place of the Robot does not satisfy the requirement that the Robot must touch the Playing Field Wall when it is in its pre-Match starting location as described in Game Manual Part 2., section 4.4.2 requirement 2.a.iii.
Q327 Alignment using a beacon

Q: Q194 has indicated that alignment using a game cone is illegal since it is not part of the robot. Is alignment using a team's beacon which is an inspected part of the robot, allowed to be used for alignment?

A: No, a Beacon does not satisfy several of the rule G15 requirements for Robot setup alignment:

a) The Beacon is not "a legal component that is part of the Robot."

b) The Beacon may not "be reset to be within the 18-inch (257.2 mm) cube starting volume constraint" because the Beacon may only enter the Playing Field during the End Game Period.

(Asked by 13474 answer published at February 6th 2023)

Q332 Adjusting Signal Sleeve Cone during Autonomous

Q: After initialization, a team noticed the camera is not "seeing" the signal sleeve because the cone may be rotated or moved along the floor tape in such a way that prevents the robot camera from seeing the sleeve. May a team request the field ref to move/rotate the cone until the robot camera can "see" the sleeve? Does the field ref have to fulfill the request?

A: The answers to the questions depends on when the Drive Team asks Field Personnel for assistance as described below.

A) During Pre-Match Robot setup:

Signal: During Pre-Match Robot setup, the Drive Team may ask an FTA, FTAA, or referee to reposition the Signal so that it is centered on the location tape and Image #1 is facing the correct direction towards the Alliance Station Wall. Upon request, Field Personnel are expected to correct Playing Field setup errors per rule G12. This is also the appropriate time to notify Field Personnel about any Playing Field setup concerns.

Signal Sleeve: The Drive Team is responsible for placing their Signal Sleeve onto the Signal with "Team Image 1" facing the associated Alliance Station as stated in section 4.4.1 d in Game Manual Part 2. The Drive Team may adjust an incorrectly placed Signal Sleeve as it sits on the Signal, up until the time that the referee crew notifies Drive Teams that the Playing Field is "frozen."

B) After the Playing Field is "frozen" by the referee crew, the Drive Team may ask a referee to adjust the position of the Signal/Signal Sleeve. The referee may comply with the request, however the referee is not required to adjust the Signal/Signal Sleeve between the times when the "Playing Field is frozen" announcement is made and before the Signal/Signal Sleeve is adjusted for the randomized orientation for the Match.

Note: Referees, are expected to maintain the Signal/Signal Sleeve's centered location on the tape and to orient the appropriate image towards the Alliance Station Wall during Playing Field randomization. Randomization repositioning is not a precise operation. Rulers, protractors, lasers, alignment tools, etc. are not used to reposition the Signal/Signal Sleeve. Robots should be designed to accommodate expected small deviations of Signal/Signal Sleeve positioning. Drive Teams should immediately notify the referee crew if an error is made during Signal/Signal Sleeve randomization movement. Upon timely notification, Field Personnel are expected to remEDIATE an incorrectly randomized Signal/Signal Sleeve before the Match starts.

(Asked by 5501 answer published at February 7th 2023)

Traditional - Autonomous Period

Q24 Clarification around rule GS3 and Centerline Interference

Q: Rule <GS3> makes autonomous interference illegal, but with the exception that "Interactions at the centerline junctions will not be considered interference". Does this mean that auto a robot can: a) be positioned over both sides of the centerline and contact an opposing robot, b) drive over the ground junction to cycle cones, c) hit the junction pole causing the opposing robot to miss, or d) perform defensive activities not intended to score points without getting penalized?

A: The rule GS3 forgiveness for Robot interactions at the centerline Junctions during the Autonomous Period should only apply to unintentional interactions that happen as a result of autonomous Scoring activities.

a) The Robot's actions in this scenario are allowed unless the referees watching the Match view the actions as a deliberate strategy to Interfere with the opposing Alliance Robot. For example, a Robot that Parks over the centerline without making a Cone Scoring attempt in this location is likely to be viewed as causing deliberate interference.

b) The Robot's actions in this scenario are probably allowed. The ultimate decision would be determined by the referee crew.

c) Without the benefit of further context, this appears to be a defensive strategy that will likely be viewed by the referee crew as violating rule GS3.

d) This scenario violates rule GS3 and a Major Penalty should be assessed.

(Asked by 16379 answer published at October 3rd 2022)

Q43 Centerline interference in auto

Q: For the following autonomous scenario (use the naming in game manual 2 appendix B): red alliance robot starts from tile F5, move forwards to tile C5, try to make a cone scoring on centerline junction X4. The scoring attempt takes N seconds and then the robot leaves tile C5. Is there a general guidance on the range of N to make this legal without a penalty (e.g., N <=5), or it's ok for N >> 25?
A: This scenario as described does not violate any rules, provided that the Robot is Parked at the end of the Autonomous Period. The length of time for the Scoring attempt "N" car fill all of the remaining time in the Autonomous Period.

Adding interaction with an opposing Alliance Robot is a completely different issue. The Game Design Committee is not able to specify a value of "N" that protects the Robot while has crossed the Playing Field centerline. The ultimate decision would be determined by the referee based on the observed Robot actions.

(Asked by 14179 answer published at October 4th 2022)

Q45 Follow up of Q43

Q: If the red alliance robot moves to tile C5 first, then the blue alliance robot tries to move to C5 as well, hits the red alliance robot and causes red alliance's scoring attempt fail, is there a penalty? Which alliance will get a penalty (Red or Blue)?

A:
The intent of the rule GS3 exception for Robot interactions at the centerline Junctions during the Autonomous Period is to not Penalize inadvertent actions. Intentional Interference will likely receive a Major Penalty for violating the Autonomous Interference rule GS3.

The Game Design Committee cannot comment absolutely on this scenario. The ultimate decision would be determined by the referee at your event, with the final call made by the Head referee. Followup questions that add detail are unlikely to receive a definitive ruling in this Q&A forum because the referees watching gameplay are best suited to make this type of judgment call.

(Asked by 14179 answer published at October 4th 2022)

Q50 Clarification Around the Autonomous Bonus

Q: Each alliance has 6 distinct signal zones (3 per robot) that can be parked completely in for a point bonus. Can a robot: 1) park in the corresponding zone for their alliance partner 2) pull their alliance partner into the corresponding zone and get the autonomous for both robots? Additionally, in both of these situations, 3) how is the 10 point vs 20 point bonus decided per robot?

A:
Answer 1: Yes.

Answer 2: No. Grasping a Robot is not allowed per rule G25.

Answer 3: The Signal (10 point potential) or Signal plus Signal Sleeve (20 point potential) closest to the Robot at the start of the Match determines the potential Score Value of the Signal Bonus for the Robot.

Pro Tip: The Game Design Committee highly recommends coordinating the Alliance's gameplay strategy with your Alliance Partner before bringing the Robots to the Playing Field for Pre-Match set up. The Alliance's Match gameplay plan should not be decided at the Playing Field.

(Asked by 16379 answer published at October 5th 2022)

Q64 In autonomous, do you need to move away from the stack to score?

Q: Our robot is designed to trap cones against the wall to minimize inconsistencies. To score a cone during autonomous, do we need to move away from the stack then return, or can we cycle cones from the "trapped" position? Specifically, is this considered controlling more than one cone in auto? The design is a shaped guide. No grasping or manipulation is performed.

A:
Yes, the Robot in this scenario violates Rule GS6a because Trapping is a form of Control.

(Asked by 14840 answer published at October 14th 2022)

Q129 Is it interference if bending the pole in auto when score

Q: In auto, assuming 2 robots from 2 alliances both try to score a cone on the same pole, Robot 1 bends the pole while trying to score (because one point could push the pole away), thus robot 2 can't score it accurately. Are robot 1's actions penalized for interference?

A:
As long as both Robots are attempting to Score (i.e., purely offensive action - no defense) rule GS3 consequences for Interference should not apply.

Note: Robot interactions at the centerline Junctions (row X) are not considered Interference during the Autonomous Period per rule GS3.

Pro Tip: During the Autonomous Period, Scoring attempts on the Junction rows closest to an Alliance's Substation (i.e., Junction rows V and W for a blue Alliance Robot and Junction rows Y and Z for a red Alliance Robot are highly unlikely to be called for Interfering with an opposing Alliance's Scoring attempt due to the Junction's proximity to the Robot's natural half of the Playing Field. Robot travel into the opposing Alliance's half of the Playing Field during the Autonomous Period has an inherently elevated risk of violating rule GS3.

(Asked by 21229 answer published at November 8th 2022)
Q151 Pushing the signal into the opposing alliance's 2nd signal zone.

Q:
During our autonomous program, our robot pushes the signal forward just over 1.5 squares, or just barely into the 2nd parking zone on the opponent's side. Is this legal?

A:
Yes, the Robot's movement described in the scenario is legal Herding per rule GS9a.

(Asked by 19368 answer published at November 15th 2022)

Q160 Robot In Contact With Playing Field Wall for Signal Bonus

Q:
If the signal zone for the signal bonus in auto is location 1. If the robot starting from the F2 tile navigates to the location closest to the audience near the wall perimeter and is in contact with the wall, would that be considered completely in the zone for the signal bonus points? Illustration E-4 in game manual part 2 states that the outer perimeter tabs are not included but on the wall side the tabs are cut off. There usually a small gap between the wall and the floor tiles.

A:
Robot contact with a Playing Field Wall adjacent to a Signal Zone does not invalidate an otherwise correctly completed Signal Bonus achievement.

(Asked by 6596 answer published at November 22nd 2022)

Q260 Clarification on alignment to cone stack from Q89 and Q258

Q:
Regarding Q89 and Q258, if a V-shaped alignment device is used in auto at the base of the stack to shift the stack (within +/- 1°), is it legal if A) the bot used the V to align the stack grabs the top cone, and drives away to score so the V is no longer in contact with the stack or B) the bot uses the V to align, retracts the V so it is no longer in contact, grabs the cone, and fully backs away. Is the difference between Q89 and Q258 the point at which the V interfaces, and when is it trapping?

A:
Answer A: [Q258](/qa/258) previously established that grasping the bottom Cone of a Cone Stack while "picking up" the top Cone violates rule GS6.a.

Answer B: If the "V" shaped assembly does not trap the Cone Stack against the Playing Field Wall, the Robot in this scenario does not violate rule GS6 because it Controls only one Cone at a time.

Answer C: Yes.

(Asked by 5356 answer published at January 9th 2023)

Q300 GS3 Preventing Access to the Cone Stack

Q:
Please comment on the legality of the following scenario. During the auto period a red alliance robot started in tile F2, then drove and parked in C2 on the blue alliance side. The red alliance robot made no attempt to score. Parked in this position the red alliance robot prevented a blue alliance robot from moving from tile C3 to C1 to pick up cones in the stack, and so could score no stacked cones. It also prevented the blue alliance robot from parking in the correct location.

A:
The red Alliance Robot should receive a Major Penalty for violating rule GS3 if the blue Alliance Robot is interfered with while it tries to access its Alliance's Cone stack or if the blue Alliance Robot is interfered with while it tries to access its Signal Zone.

(Asked by 18438 answer published at January 24th 2023)

Q307 Follow up on Question 300

Q:
Thank you for answer to question 300. We have two other questions. Question 1: Would the red robot, spoken of in question 300, receive a major penalty for each time that the blue robot attempts to access the cone stack and is prevented from doing so by the red robot? Or, would they receive one major? Question 2: Additionally, would the red robot get an additional major penalty for obstructing access to Signal Zone. Thank you for your time.

A:
Answer 1: The red Alliance Robot should receive one Major Penalty for each separate attempt by the blue Alliance Robot to access the Cone stack.

Answer 2: Yes, if the blue Alliance Robot attempts to access the Signal Zone that is obstructed by the red Alliance Robot.

Note: Operating a Robot in the opposing Alliance's side of the Playing Field during the Autonomous Period is a risky gameplay strategy due to the potential of singular and accumulated rule GS3 Major Penalties for interactions that occur away from the centerline Junctions.

(Asked by 18438 answer published at February 1st 2023)

Q317 Rule <GS3> Clarification regarding signal cone interference

Q:
We have a team that, during their autonomous, drives to put a cone on a junction, and in doing so plows their own signal cone across the centerline into the opposing alliance's area. Would this be considered a violation of rule <GS3> as it could conflict with opposing alliance's autonomous.

A:
Q351 We have a question regarding the answer to Question 317.

Q: Question: Regarding Question 317, if the new position of the Signal causes interference with the Opposing Alliance's attempts to gather a Cone from their cone stack, is this a violation of the major tenet of GS3? The action of the alliance attempting to score from the cone stack is NOT taking place "at the centerline junctions" and does not fall under that exception of GS3. This is interference because the Signal will not get across the field centerline except by an opposing Alliance Robot.

A: Answer: No, the Signal movement in the scenario described in Q317 (/qa/317) is normal and expected gameplay. Signals and Cones are known moveable obstacles on the Playing Field that need to be considered when designing a Robot and writing an Autonomous OpMode.

(Asked by 14840 answer published at February 15th 2023)

Q353 Clarification of G29

Q: Please comment on the following situation considering rule <G29> and game forum question 300: during autonomous, the blue alliance robot navigates to square C2, in the process moving significantly past their scoring position(s) and crossing the centerline. While navigating, they drive (maintain contact with) their signal cone across the center line resulting in its placement in square D2, which then interferes with the red alliance's robot several times while accessing the cone stack and parking.

A: The scenarios in this question and in Q300 (/qa/300) are completely different. In this question, the red Alliance Robot is interacting with the blue Signal. In Q300 (/qa/300), two opposing Alliance Robots are directly interacting.

The gameplay described in this question does not violate any rules. Concerning rule G29 referenced in the question, a Signal located in the open Playing Field as described in the question is a normal and expected occurrence for the POWERPLAY game. Signals and Cones are known moveable obstacles on the Playing Field that need to be considered when designing a Robot and writing an Autonomous OpMode.

(Asked by 18438 answer published at February 16th 2023)

Q366 Clarification on Q24 centerline interference

Q: We position our robot over the ground junction X1 to continuously deliver cones between D1 and junction X2, after we are done we move out of the way to park. Q1: Is this considered to be intentional interference because we intentionally stop at this location to deliver? According to Q24 answer A this does not sound like interference. If another robot runs into us while we are attempting to deliver cones, Q2: is there a penalty involved and Q3: to which alliance? https://imgur.com/a/lttepMnF

A: Answer 1: The scenario described in the question is legal gameplay during the Autonomous Period due to the exception in rule GS3 for interactions at the Playing Field centerline. Answer 2: The Scoring Robot in this scenario should not be Penalized. The opposing Alliance Robot's actions in this scenario are also allowed unless the referees watching the Match view the actions as a deliberate strategy to Interfere with the opposing Alliance Robot.

Answer 3: See answer #2.

(Asked by 19415 answer published at February 27th 2023)

Q380 Follow up to Q300

Q: This question assumes the scenario stated Q300 with one key difference. In this new version the red alliance robot drives from tile F2, crosses the centerline, either moving partly or completely, into tile C2, and attempts to score. The position of the red robot prevents the blue alliance robot from moving all, or part, of its robot from tile C3 to C1, preventing the blue alliance robot from accessing the cone stack located in tile C1. Are the red alliance's actions illegal?

A: Rule GS3 disallows Autonomous Period interference, except for interactions at the centerline which are explicitly not considered as interference. Once the Robot is across the centerline, interactions are no longer at the centerline and therefore not protected.

The application of rule GS3 in the scenarios described in the question is dependent upon the red Alliance Robot's location and actions. For example:

Scenario 1: A red Alliance Robot Completely In Tile C2 is no longer at the centerline and is therefore subject to rule GS3 consequences if it interferes with the opposing Alliance's Scoring attempts during the Autonomous Period.

Scenario 2: A red Alliance Robot In Tiles C2 and D2 is at the Playing Field centerline and is therefore protected from rule GS3 consequences for interfering with the opposing Alliance's Scoring attempts during the Autonomous Period, unless the referee crew views the red Alliance Robot's actions as an intentional defensive strategy. Intentional defensive strategies at the centerline are not protected by the rule GS3 exception for interactions at the centerline.

(Asked by 18438 answer published at March 13th 2023)

Q383 Clarification of Q380

Q: Scenario 2 in your answer to Q380 has a red alliance robot partially on the blue side of the field. Please comment on the limitations the blue alliance robot faces in terms of interactions with the parts of the red robot that are on the blue side of the field. Could the blue bot detect that they can no longer intake cones and react by pushing the red robot 1

https://ftc-qa.firstinspires.org/admin/report
the centerline so that the blue bot can reach the cone stack, considering that the red bot may suffer damage in this interaction?

**A:**

Nothing in the rules prevent pushing another Robot during the Autonomous Period. If the Robot to Robot contact is violent enough to likely cause damage, the referee crew may consider the actions to be strategic and a violation of rule G26.

(Asked by 18438 answer published at March 15th 2023)

**Q384 Stack moves in autonomous due to Opposing Alliance signal**

**Q:**

During autonomous, the red team pushes their signal across the centerline where it tips and rolls, settling against the blue team's cone stack. When the blue team robot attempts collect from that stack, it instead comes in contact with the red team's signal, which in turn pushes the blue cone stack more than an inch out of position. In this scenario is the blue team subject to 50 points in penalties for the movement of their own cone stack?

**A:**

Yes, the Signal in this scenario does not affect the application of rule G6.a consequences for Controlling and/or Possessing more than one Cone. The Penalty point total is dependent upon the number of Cones Controlled and/or Possessed above the limit of one (1) Cone.

(Asked by 21936 answer published at March 16th 2023)

**Traditional - Driver-Controlled Period**

**Q4 Human Player - Cone Interaction**

**Q:**

Can the human player interact with a cone that has been previously put onto the field? Example: a downed cone is pushed into the substation, can the human player stand it upright? (assuming no robots are in the substation when the human player touches the cone).

**A:**

Once a Cone is placed (i.e., released by the Human Player) into the Substation, Rule G22 prohibits further Drive Team contact/management with the Cone.

(Asked by 10136 answer published at September 28th 2022)

**Q10 Clarification around <GS8a> and Interference**

**Q:**

<GS8a> says that "A Robot may not Block the opposing Alliance Robot from Scoring a Cone on a Junction". Interference is not mentioned. Does this mean interference is legal? so, are the following actions permitted on a robot trying to score a cone? A) A robot hits the pole that the opponent is trying to score on, causing the opponent to miss. B) A robot pushes an opponent robot out of the way that is trying to score. C) A robot hits an opponent robot, causing them to lose grip on their cone.

**A:**

A Robot may not impede or obstruct an opposing Alliance Robot from Scoring a Cone on a Junction once the Cone is In the Junction Area. Each violation results in an immediate Minor Penalty and additional Blocking Penalties per rule G28 as appropriate.

For all three scenarios, if the Cone is In the Junction Area, the offending Robot should receive an immediate Minor Penalty and additional Blocking Penalties per rule G28 as appropriate.

(Asked by 16379 answer published at October 4th 2022)

**Q23 Scoring Cones in the Driver-Controlled Period**

**Q:**

4.2.2 Gameplay Overview The two-minute Driver-Controlled... Alliances earn points by: 1. Placing Cones on Junctions. Shouldn't this include Terminals also per 4.4.3 or am I missing some nuance?? 4.4.3 Driver-Controlled Period 1) placing Cones earn points... a) Cone placed In... Terminal earns... b) Cone Secured on a... Junction earns...

**A:**

Yes, you are correct. Alliances can earn points by placing Cones In Terminals during the Driver-Controlled Period. This omission will be corrected in a future release of the Game Manual Part 2.

(Asked by 7678 answer published at October 3rd 2022)

**Q27 Descoring a Cone from a Ground Junction and its impact on Penalties and a Circuit Score**

**Q:**

If a robot knocks an opponents secured cone off of a ground junction (thus incurring the minor penalty of 10 points) and the descored cone was on an essential junction to completing the opponents circuit (thus nullifies the circuit with an opponent loss of 20 points) does the circuit still score for the opponent as 20 points (as if the cone were replaced)?

**A:**

No.

If the referee deems the descoring is intentional, a Major Penalty and Yellow Card for violating rule G30 may apply.
Q33 Moving an Autonomous Period Scored Cone from a Terminal to Score it on a Junction.

Q: The game rules state in 4.4.2 that a cone placed in the terminal during autonomous play is scored 1 point. The same section also states “cones that are scored in the autonomous period will earn additional points at the end of the driver-control period if they remain in place. If a cone is placed in the terminal during autonomous driving and then moved to a low junction during the driver-control period, how will it be scored?

A: Assuming that the Alliance and Cone colors match and the Cone is not the top Cone on a Junction at the End of the Match, Scoring for the Cone is:

Autonomous Period Score: 1 point
Driver-Controlled Period Score: 3 points
Total Score: 1 + 3 = 4 points

Q58 Tipped Junction Pole Penalties and Righting

Q: Q14 clarifies that cones on tipped over junction poles are worth zero points. 1) If the junction tips because of a robot bumping it or scoring on it, does that robot earn a minor penalty per opposing alliance cone on the pole? 2) Could a robot grasp a cone on a tipped junction and use it to right the pole? (The robot wouldn't contact the junction) 3) If 1&2 are yes, if a robot rights a junction do the penalties go away? Is this true if a robot rights a junction that the opposing alliance tipped?

A: Answer 1: Yes, per rule GS5a.
Answer 2: A Robot may not attempt to upright a tipped over Junction.
Answer 3: Not Applicable.

Q70 Human players placement of cones clarification.

Q: Question 1: When a human player places a cone into the substation, can the cone make contact with ground before the human player releases it? Question 2: Or is the human player required to drop the cone into the substation?

A: Answer 1: Yes
Answer 2: No

Q80 Scoring Interference by Delay <GS8>

Q: Two robots approach a low junction from opposite sides near the end of a match. Red raises a cone over the junction and blue raises a cone over but not touching/interfering with red’s. Knowing they will immediately be covered by blue, red slows down not immediately releasing its cone. How much time would have to pass before red switches from attempting to score, to blocking blue? If red releases and scores right at the buzzer does it legitimize any length of time based on an intent to score?

A: We cannot comment absolutely on this scenario. A referee watching gameplay is in the best position to make this determination. The ultimate decision would be determined by the Head referee.

A Robot Possessing a Cone in the Junction Area is expected to complete their Scoring attempt and then move away from the Junction; completing the Scoring attempt in a reasonable length of time as determined by a referee so that the Junction is available to other Robots.

Q82 Additional human player clarification

Q: Q70 confirms that the human player can still be touching the cone as it makes contact with the mat. The answer to Q4 seems to imply that the cone is not placed/released until the human player releases it. Can the human player slide or shift the cone as long as they have not released it and the cone maintains contact with the mat?

A: No.
Q121 Clarification around Blocking and Junction poles

Q:
Blocking is defined as Blocking all paths of access to: 1) an Area, 2) an Alliance Specific Game Element, or 3) all remaining Alliance Neutral Game Elements. A) Is this interpretation correct? The Junctions are defined as both an Element, Alliance Neutral but never an Area. Can a robot prevent access to: B) a specific Junction or C) multiple Junctions, provided there is an available point-equivalent junction to score on?

A:
Answer A: The complete definition of the terms Block/Blocking is found in section 4.3 of Game Manual Part 2. The "understanding" of the definition described in the question is a subset of the full definition.

Answers B and C: No. Rule G28 consequences will apply when a Robot Blocks an opposing Alliance Robot that is attempting to access an Area or Game Element for an extended period by obstructing all paths of travel to the object or Area.

Rule GS8a or GS8c consequences will be applied when a Robot impedes or obstructs an opposing Alliance Robot from Scoring a Cone or Beacon on a Junction once the Scoring Element is In the Junction Area.

Note: This is the latest of several posts to the gameplay Q&A forum that attempt to find legal defensive strategies that prevent Scoring on a Junction. After reading the answers to these posts, it should be clear that Blocking access and/or impeding/obstructing access to Scoring on a Junction is not legal (i.e., illegal) gameplay. In other words, Junction defensive strategies are not allowed when an opposing Alliance Robot's actions clearly indicate that their intent is to Score on that Junction.

(Asked by 16379 answer published at November 7th 2022)

Q125 robot cycling between high pole and Substation has to let opposite alliance score ground?

Q:
If a red alliance robot sits on the middle line of tiles B3 and B4 (next to high pole), extends a horizontal slide to intake from A3/A4, deposit to high pole W3, the opposing alliance (blue) robot comes to score on the ground junction V3, does the red alliance robot have to wait and let the blue alliance robot score that ground junction? Or can the red alliance robot continue to intake and score as the blue alliance robot is also scoring?

A:
The ultimate decision would be determined by the referee watching gameplay, with the final call made by the Head referee.

In general, to avoid violating a rule in this scenario, the red Alliance Robot may not: 1) Block all paths of travel to the Ground Junction (V3) per rule G28 when it is clear/obvious that the blue Alliance Robot is attempting to access the Ground Junction to Score a Cone or Beacon; 2) Impede or obstruct the blue Alliance Robot from their Scoring attempt on the blue Alliance Robot's Cone or Beacon is In the Ground Junction Area (V3) per rule GS8.

In this scenario, it is highly likely that the red Alliance Robot will need to suspend their Scoring activity to allow the blue Alliance Robot to Score on the Ground Junction (V3).

The blue Alliance Robot has an equal obligation to complete their Scoring attempt and yield access to the appropriate Junction(s) and/or Terminal in a timely manner per rules G2 and GS8.

(Asked by 21229 answer published at November 8th 2022)

Q135 Can we get a misplaced cone out of the opposing alliance's terminal?

Q:
During a practice match, (us)Blue Team put a blue cone in a red terminal. Blue Team attempted to correct it's error by taking the blue cone out, put the referee stated that it was descoring and not allowed, even though it was our cone in their terminal. However, we couldn't find anywhere in the Game Manuals where it mentioned this. Could someone please explain this?

A:
Rule GS5b does not apply in this scenario because a blue Cone In a red Alliance Terminal has zero Score value and therefore its removal is not descoring.

Removal of the blue Cone from the red Alliance Terminal is allowed, provided that the blue Alliance Robot does not Block a red Alliance Robot attempting to Score in the Terminal

(Asked by 21852 answer published at November 10th 2022)

Q143 Driving Through Opposing Alliance Terminal

Q:
Our robot starts in A5, performs its autonomous, and parks in B6. As part of our opening move in teleOp, the robot moves through A6 and over to the substation. We were told this is illegal because the robot moves through the opposing alliance terminal. After searching the game manuals and Q&A forum, we do not see a rule against it. Have we missed something? Thank you!

A:
The Robot's actions in this scenario are allowed, provided that the Robot does not Block an opposing Alliance Robot that is attempting to access their Alliance's Terminal.

(Asked by 14840 answer published at November 14th 2022)

Q150 Game Element Placement

Q:
Can the Opposing Alliance place their cone intentionally in an unsecured location in front of our Substation to force our robots to travel around it? Must all paths be blocked before G29 comes into play? Ref: G29
A: The referee crew may view this scenario as a violation of rule G29 for illegal use of Game Elements.

A remedy to this situation is provided by rule GS6.e.iii: "Plowing through any quantity of either Alliance’s Scoring Elements is allowed."

(Asked by 18738 answer published at November 15th 2022)

Q169 Disabled Alliance Robot in Substation and GS13

Q: Understanding GS13, "A Disabled Robot In an Alliance Substation is not considered a safety hazard to the Human Player, therefore Scoring Elements may continue to be placed A Disabled Robot is defined, as "A Robot that is no longer active for the remainder of the Match due to a Robot failure or by the request of a referee.” 1) Does the ref need to declare a robot disabled to the human player? 2) If the human player introduces cones, can the ref declare the robot disabled after the match?

A:

There are two ways a robot can end up disabled in a match; due to robot failure and by request of a referee.

When a referee declares a robot disabled due to a rule violation, they will ask the team to drive the robot to neutral, non-scoring location and put their controllers down. This should include robot NOT being parked in the substation.

When a robot becomes disabled due to robot failure, normally an FTA gets involved and works with the team to attempt recovery. The status of the affected robot is normally determined by a collaborative assessment with the FTA and the Head Referee both involved. The head referee has some flexibility in determining when the disabled status begins based on the conversations with the FTA.

In short, due to the quick pace of gameplay, it is to your alliance's benefit to have the human player ask about disabled status and seek FTA assistance as soon as you are concerned about the state of an robot that has apparently failed.

We are providing guidance to the referee community to communicate with the human players as efficiently as possible to minimize impact when robots fail in the substations.

(Asked by 18474 answer published at November 23rd 2022)

Q180 sensor use during the driver control period

Q: Sensors are a vital part of the autonomous period to allow the robot to move around on its own. Are we allowed to use sensors to also assist us during the driver-control period? We wanted to create an emergency button on the robot so that if it is pushed by a mechanism on the robot it will stop moving to prevent further harm to the robot.

A: Yes

(Asked by 19591 answer published at November 28th 2022)

Q197 What is considered blocking?

Q: Is a robot allowed to remain parked if another robot is approaching & attempting to occupy the same location or would this be considered blocking? Based on definition in the game manual-“Preventing an opposing Alliance Robot from accessing an Area or Game Element for an extended period by obstructing ALL paths of travel to the object or Area.” It seems robots that remain stationary would fall into this criteria of not allowing access to a specific ‘Area’, if ‘Area’ includes a specific tile.

A:

There are many questions in the Q&A Form about Blocking, we suggest that you search the Q&A Forum for the keyword “Block” and closely read rules G28, GS6, and GS12 in Game Manual Part 2.

The answer to your question depends upon the location of the Parked Robot and the actions of the opposing Alliance Robots. Here are a few examples that may help with your understanding of Blocking.

1) A Blue Alliance Robot Parked in Tile locations A1, A3, or A4 is highly unlikely to be viewed by a referee as Blocking because the potentially Blocked Areas are Blue Alliance specific Areas.

2) A Robot Parked in Tile locations C3, C4, D3, or D4 is unlikely to be viewed as Blocking because there are open paths of travel to the Junctions adjacent to the referenced Tiles.

3) A Robot Parked on top of a Ground Junction that an opposing Alliance Robot shows a clear intent to Score on should be viewed by the referee crew as Blocking. See Q54 (qa/54) , Q60 (qa/60) , and Q121 (qa/121) for additional information about this example scenario.

(Asked by 15358 answer published at December 5th 2022)

Q230 Human player cone placement

Q: After the human player has picked up a cone and placed it into the substation and removed their body from the substation area if the cone is then knocked over by a robot can, after all robots have left the zone, the human player stand up the cone that is knocked over inside of the substation?

A: No, the Human Player may not touch a Cone or Beacon that was previously placed In a Substation.

(Asked by 4886 answer published at December 13th 2022)
Q235 USB splitter use

Q: Our driver hub only has one functioning USB port and we need to use two USB ports for two gamepads. Can we use a USB splitter to connect the two gamepads.

A: Yes. Use of a non-powered USB hub within the Driver Station is allowed per DS04 - this was intended to support use of two gamepads with an Android Phone.

We verified with REV Robotics that a USB hub attached to the USB ports on the Driver Hub is supported.

(Asked by 21781 answer published at January 12th 2023)

Q253 Human Player interaction with robot out of Substation but in Tile A3

Q: A team was told by a ref that they had to leave A3 fully before scoring V2 because of human player safety, not just the Substation area itself. We thought that GS13g & GS13h on applied to human interaction in the substation, not the whole time that the substation is on. Can you please clarify?

A: You are correct, rule GS13.g and GS13.h constraints only apply when a Robot is In the Substation Area. The Human Player may place Scoring Elements into a Substation while Robot(s) are In Tile A3 and/or A4 (F3 and/or F4 for the red Alliance Substation) as long as all Robots are Outside the applicable Substation Area.

Pro Tip: It is helpful to the referee crew and advantageous to Teams for Robots to be clearly Outside the Substation while the Human Player places Scoring Elements. Robots that are clearly Outside the Substation will avoid unnecessary warnings and Penalties.

(Asked by 5356 answer published at January 2nd 2023)

Q269 Human player cone stacking questions.

Q: Question 1: Is the human player allowed to stack cones in the substation assuming only one cone is introduced at a time? Question 2: The human player is allowed to place the first cone directly on the mat. Are cones stacked on top of the bottom cone allowed to placed directly onto the bottom cone or must they be dropped from some minimum height to avoid contact? Question 3: If stacking is allowed, is there a stack height limit?

A: Answer 1: Yes.

Answer 2: The Human Player may directly place a Cone onto a Cone that is already in the Substation. Dropping the Cone is also allowed.

Answer 3: No.

(Asked by 19746 answer published at January 11th 2023)

Q272 Human player moving already placed cone with a cone

Q: In reference to <GS13>, Is it legal if the human player places a cone into the substation and an already placed cone is moved out of the substation? For example, If the substation already has a few cones in it, the Human Player places a new cone and knocks the already placed cone out of the way.

A: We believe Q4 (qa4) answers your question. If it does not, please rephrase your question and resubmit.

Once a Cone is placed (i.e., released by the Human Player) into the Substation, Rule G22 prohibits further Drive Team contact/management with the Cone.

(Asked by 6078 answer published at January 11th 2023)

Q284 Can the human player manipulate multiple cones within the Substation Storage?

Q: 1) Can the human player handle cones within the substation storage during the driver-controlled or endgame period? i.e., can they rearrange the cones into smaller stacks. 2) Can the human player do so by handling multiple cones at a time? i.e., grabbing 3 cones and putting them in a separate stack within the substation storage. 3) Can the human player hold a cone or multiple cones in one hand without crossing the field barrier while the other hand introduces a singular cone into the substation?

A: Answer 1: Yes

Answer 2: Yes

Answer 3: Yes, provided that it is clear to the referee crew that only one Cone crosses into the Playing Field Perimeter at a time.

(Asked by 13948 answer published at January 19th 2023)

Q292 Can a robot hover a cone over a robot to cause a penalty while collecting in
its junction

Q:
A strategy is to park and hover a cone over our robot while we are collecting from our substation and partially in the area of a junction. We are not parked or motionless. The strategy of their action could cause our team a penalty. Rule 4.5.2 G3 Forcing a penalty the action of the opposing robot is what has caused the penalty. We can get to this position on the field first but don't stay for the full game. Does collecting from a substation and delivering to a junction have equal right?

A:
We cannot comment absolutely on this dynamic gameplay scenario. The ultimate decision would be determined by the referee at your event, with the final call made by the Head Referee.

Your Team's Robot in this scenario appears to violate rule GS8.a for impeding or obstructing an opposing Alliance Robot from Scoring a Cone on a Junction once their Cone is in the Junction Area. Your Robot needs to yield its location on the Playing Field so that the opposing Alliance Robot is able to place its Cone on the Junction in question.

(Assumed by 11272 answer published at January 23rd 2023)

Q304 Can a Human hand break the plane of the substation, the "V" portion while placing a cone?

Q:
-- A Human cannot break the plane of field when a robot is in the substation (has broken the outer plane of the substation tape). -- A robot cannot enter the substation (outer edge of substation tape) when a Human hand is in the substation (inside the outer edge of substation tape). Can a Human hand break the plane of the substation (outer edge of the substation tape) "V" portion while placing a cone on the tape?

A:
Yes, provided that the action is performed in a safe manner. For example, breaking the plane of the Substation boundary only as much as necessary and only for the time that is necessary to place the Cone.

(Assumed by 13661 answer published at January 30th 2023)

Q309 Clarification to Q125 -- long reach into substation blocked by opponent robot

Q:
Q125 describes red robot using a long reach to the Substation from tiles (in/around Y3), blue attempting to score on Z3 junction. Red yields to Blue. Last sentence of answer: Blu must equally "yield access to ... Terminal in a timely manner", but is silent on yielding access to the "Substation". Can the blue robot use extended-time scoring attempts on Z3 to delay red robot's use of long reach to the Substation? If referee determines delay, what penalties apply?

A:
The ultimate decision for applying rule GS12 consequences for Blocking access to the opposing Alliance's Substation would be determined by the referee watching gameplay, with the final call made by the Head Referee.

Rule GS12 is clear about how the referee crew will address a Robot that Blocks access to the opposing Alliance's Substation. Rule GS12 states in part: "The first instance will result in a Warning and any following violations resulting in a Major Penalty and an additional Minor Penalty assessed for every five seconds that the rule violation persists. If the referee declares a Blocking access Warning, the offending Robot must move away at least 3 feet (0.9 m), approximately 1.5 floor Tiles from the Blocked Substation. Failure to move the required 3 feet (0.9 m) within 5 seconds is considered an additional violation and will incur the Penalties described above. Additional occurrences of violations of this rule will escalate to Yellow Cards quickly.

(Assumed by 7172 answer published at January 30th 2023)

Q310 scoring delay

Q:
Redbot has long reach to Substation from around Y3. Bluebot approaches Z3 with a cone, Redbot yields to Bluebot. Redbot adjusts to intake from angle that does not interfere w Bluebot. Bluebot does not complete scoring, drives across Z3 to score from new position that blocks Red. Pattern repeats multiple times, with Bluebot driving back+forth across+around Z3 with a cone but never complete scoring. Is this legal play by Bluebot? Q80 addresses delays for access to Junctions but not Substation.

A:
The blue Alliance Robot in this scenario is likely to be viewed by the referee crew as violating rule GS12 because it is using a shadowing maneuver to Block the opposing Alliance Robot from accessing its Alliance's Substation.

(Assumed by 7172 answer published at January 30th 2023)

Q313 Is pushing already knocked over cones a penalty?

Q:
In one of our matches we (Blue Alliance) pushed a stack of cones that the Red Alliance had already knocked over. We were driving to the Blue terminal to put a cone in it and pushed the stack of knocked-over cones with us. Would this count as a penalty? Here is a link to the FTC Reddit post: https://www.reddit.com/r/FTC/comments/10on9hi/is_this_a_penalty/.

A:
We cannot comment absolutely on the Robot action in the video. The referee crew watching gameplay from multiple locations near the Playing Field are in a much better position to make this decision. Watching a video replay from one observation location can be deceiving. The ultimate decision would be determined by the referee at your event, with the final call made by the Head Referee.
Q325 Can the human player place the cone in substation with the cone nearly touching the robot?

Q: During the driver-controlled period, is the human player allowed to place the cone so the cone nearly touches the robot, provided the cone is in the substation, and the robot is Completely Outside the substation? To clarify, are we not sliding the cone along the ground, but just placing it against or next to the robot. Is this allowed by the rules?

A: Technically, the answer to the question is yes. However, the actions may cause the Alliance to receive Penalties for violating rules GS13 and/or G22 if the referee crew believes that the Robot is actually in the Substation or if the placed Scoring Element touches the Robot.

The Human Player and Robot operators should make it obvious to the referee crew that the Robot is Outside the Substation when the Human Player places a Scoring Element in the Substation and that the Robot does not contact the Scoring Element before the Human Player is Outside the Playing Field Perimeter.

(Asked by 7951 answer published at January 30th 2023)

Q335 Clarification around <GS12> and Substation Defense

Q: Good afternoon HQ Staff, Assuming Robot A is never In or Blocks Robot access to opposing Robot B's Substation: a) If Robot A pushes Robot B into B's Substation, b) If Robot E is held in its Substation for a brief amount of time (under 3 seconds), c) If the above conditions above are met, but the Human Player also demonstrates intent to place a Cone in Robot B's Substation (without breaking the boundary of the field wall), does Robot A get any penalties? Thank you - KookyBotz

A: The G28 Pinning, Trapping, or Blocking Robots rule will be applied in this gameplay scenario.

The referee should notify Robot A’s Drive Team and start their count at 2, since by the time the count is started, at least one second has gone by. Robot A must back off a minimum of 36 inches by the count of 5 to avoid being penalized. If Robot A does not back up in a timely manner or far enough away, the referee should assign a Minor Penalty for every five seconds until Robot A has moved at least 36 inches away from Robot B.

Due to the strategic importance of the Substation, continued use of this defensive strategy will escalate quickly to a"Yellow Card" and a possible rule G30 rule violation for egregious gameplay.

(Asked by 16379 answer published at February 9th 2023)

Q337 Can a robot score for parking by "controlling" another robot into the terminal

Q: Q1: a) If a robot controls a nonfunctional opposing alliance bot at the end of the match, could they score for parking in a terminal by pushing the disabled bot into their own alliance terminal, even if the active bot doesn’t break the plane of the terminal, since the "controlled" object is considered a part of the controlling robot? b) Would both robots score for parking if they are from the same alliance? Q2: Would the answer for #1 be the same for controlling a robot that is operational?

A: Answer 1a: No, a Robot itself must be Parked In their Alliance's Terminal to earn points for accomplishing the End Game Navigating task.

Answer 1b: No, only Robots that are In their Alliance's Terminal earn points for accomplishing the End Game Navigating task.

Answer 2: The operational state of the Robot does not change the answers to questions 1a and 1b.

(Asked by 16461 answer published at February 9th 2023)

Q338 Does controlling a disabled robot that possesses a cone count as controlling a cone?

Q: Question 1: If a disabled robot (either by failure or declared by referee) possesses a cone, does intentionally moving the disabled robot count as "controlling" the cone (meaning that the still working robot should not control another cone while moving the disabled robot to avoid a GS6a penalty)? Question 2: Would this also mean that the opposing alliance could not move the disabled robot without incurring a GS6b penalty?

A: Answer 1: No.

Question 2: No.

(Asked by 16461 answer published at February 9th 2023)

Q339 What penalties may apply for moving a disabled robot?

Q: 1. While you are moving a disabled robot, it should be “part of” your Robot based on the definition of “Control”. Could penalties under G28/GS8 apply if you leave the disabled robot someplace that later becomes a concern after you are no longer controlling it? 2. Can you confirm that moving a disabled robot to a strategic position (not blocking or trapping, but possibly making navigation or scoring more difficult for the opposing alliance) would not incur a penalty under GS8/G28?

https://ftc-qa.firstinspires.org/admin/report
**A:**

Answer 1: First of all, this is an overly broad application of the defined term "Control". In general, it is likely that the referee crew will view relocating a nonfunctioning or referee declared Disabled Robot to potentially gain a strategic defensive gameplay advantage as an illegal activity. The Game Design Committee recommends applying rule G29 consequences in this scenario.

Answer 2: See Answer 1.

(Asked by 16461 answer published at February 9th 2023)

**Q344 Follow up to Q335 and Substation Defense Limitations**

**Q:**

Dear HQ staff, just a quick follow up to the scenario from Q335: a) If Robot B is pushed into but not pinned/held against Substation wall does Robot A receive G28 Penalties? b) If a but B is briefly held against the Substation wall (<2s) does A receive G28 Penalties? c) Can repeated use of the strategy from a/b) escalate to G30 without G28/pinning count being called? d) If a Human Player violates G13g/h after A has already started pushing B into a Substation, who gets a Penalty? Thank you - KB

**A:**

The Game Design Committee will not provide additional bespoke guidance for the Q335 (qa/335) type scenarios. Referees watching gameplay are in the best position to apply the simple rule G28 constraints and consequences.

Reminder: The rule G28 five (5) second count is not permission to violate the rule for just under 5 seconds. Teams are expected to back their Robots away from Pinning/Trapping/Blocking situations as soon as the initial count begins. The 5 second count is a grace period to allow the Robot back away to fully take place.

Attempts to avoid G28 consequences by repeated use of the five (5) second grace period should result in the application of G28 Penalties and G30 consequences for repeatedly violating rule G28.

The Substation is a small and very important Alliance Specific Area on the Playing Field. Robots should be careful when operating near an opposing Alliance's Substation. Rule violations near the opposing Alliance's Substation should be enforced rigidly and quickly.

(Asked by 16379 answer published at February 13th 2023)

**Q347 Further Clarification around <G28> and Pinning**

**Q:**

Good afternoon HQ Staff. In <G28>, it is stated “the offending Alliance will receive a Minor Penalty for every five seconds that they are in violation”. Assume R1/R2 are red Robots and B1/B2 are blue Robots: a) If R1 pins B1 for 3s, moves 3ft away, then pins B2 for 3s, beginning within 5s of pinning B1, does R1 receive a penalty? b) If R1 pins B1 for 3s, moves 3ft away, then R2 pins B2 for 3s, drives 3ft away, and then within 5s R2 pins B1 for 3s, does R1/R2 receive a penalty? Thank you - KB

**A:**

The Game Design Committee will not provide additional guidance for the Q335 (qa/335) type Substation defense scenarios that attempt to probe game rules to find a loophole that allows the shutdown of Robot operations in and around the opposing Alliance's Substation. It should be very clear by reading the game rules and answers to questions in this gameplay forum that the Robot actions described in these scenarios are not allowed. Also, see the related post Q344 (qa/344).

An Alliance using the defensive gameplay strategy described in this question should expect to be penalized for violating rule G28 and if continued, rule G30.

(Asked by 16379 answer published at February 13th 2023)

**Q363 Interpretation of GS8 with potential incidental blocking of vertical access to a junction**

**Q:**

Our robot scores cones onto the closest high junction to the substation via rotating our arm 2 feet above the adjacent ground junction. GS8a says that we “may not impede or obstruct an opposing Alliance Robot from Scoring a Cone on a Junction”. If the opposing Alliance Robot brings a cone into the adjacent ground junctions Junction Area, but is still capable of scoring with the 2 feet of vertical space, do we have to follow the procedure defined in G28 for leaving the area?

**A:**

As pointed out in the question, rule GS8,a comes into play when a Robot is impeding or obstructing an opposing Alliance Robot from Scoring on a Junction once the Cone is In the Junction Area. There are too many Robot location and operational variations to provide an absolute answer to this question. The referee crew watching gameplay will make this determination.

If the referee determines that rule GS8,a is violated, the Robot needs to follow the rule G28 guidance for moving away from the opposing Alliance Robot to avoid additional rule G28 violation Penalties.

(Asked by 17235 answer published at February 27th 2023)

**Q375 Clarification of defensive strategy in front of Substation**

**Q:**

1) Redbot goes to B3/B4, extends to occupy tiles B5,B4,B3,B2, and remains stationary, creating significant obstacle for Blue Robots to access their Substation and select "Junctions". 2) Same as #1, but Redbot also occupies tile B6. Is Redbot at risk of penalties; if so, which ones? We believe these defensive strategies are not likely to be the spirit the game or FTC. We ask because we cannot find rule/forum text that clearly limits such gameplay and seek guidance on its legality.

**A:**

Yes, the red Alliance Robot is at risk of incurring Penalties as described below.
a) Substation: The ultimate decision for applying rule GS12 consequences for Blocking access to the opposing Alliance's Substation would be determined by the referee watching gameplay, with the final call made by the Head referee.

Rule GS12 is clear about how the referee crew will address a Robot that Blocks access to the opposing Alliance's Substation. Rule GS12 states in part: "The first instance will result in a Warning with any following violations resulting in a Major Penalty and an additional Minor Penalty assessed for every five seconds that the rule violation persists. If the referee declares a Blocking access Warning, the offending Robot must move away at least 3 feet (0.9 m), approximately 1.5 floor Tiles from the Blocked Substation. Failure to move the required 3 feet (0.9 m) within 5 seconds is considered an additional violation and will incur the Penalties described above. Additional occurrences of violations of this rule will escalate to Yellow Cards quickly.

The Substation is a small and very important Alliance Specific Area on the Playing Field. Robots should be careful when operating near an opposing Alliance's Substation. Rule violations near the opposing Alliance's Substation should be enforced rigidly and quickly.

b) Junction: Blocking access to a Junction, and impeding or obstructing an opposing Alliance Robot from Scoring a Cone on a Junction were previously addressed by Q10, Q121, Q209, Q125, and Q213.

(Asked by 7172 answer published at March 7th 2023)

Traditional - End Game

Q13 Can the human player stack a beacon on top of a cone in the substation?

Q: Can the human player stack a beacon on top of a cone in the substation? If the human player drops the beacon on top of a cone without interacting with it, it seems like this would not violate G22 or any other rule.

A: Yes.

(Asked by 8813 answer published at September 28th 2022)

Q48 Must a circuit include an upright cone in the terminals?

Q: GM2 defines circuit as "A continuous path of Connected Alliance Owned Junctions that links the two (2) matched Alliance Owned Terminals." Alliance owned junctions linking the terminals would not appear to require a cone in each terminal, but the example in App F and the video does have an upright cone in each terminal zone. Is this required?

A: Yes, a completed Circuit requires at least one corresponding Alliance Cone In each of the Alliance's Terminals.

Note: Rule GS7 b) states that Cones may be placed in the Terminal in any orientation to Score.

(Asked by 21672 answer published at October 5th 2022)

Q81 May a robot pick up the cone with a beacon on top and score them both at the same time?

Q: Question 1: During the end game, may a human player put a cone into the substation and then put a beacon on top of it? Question 2: If so, can the robot pick up the cone with a beacon on top and score them both at the same time?

A: Answer 1: Yes
Answer 2: Yes, provided that the Robot Controls no more than one (1) Cone and one (1) Beacon.

(Asked by 8513 answer published at October 26th 2022)

Q142 May a robot score its alliance partner's beacon?

Q: If a robot only scores one Beacon during a match, and it belongs to its alliance partner, will that Beacon still be counted as scored?

A: Yes

(Asked by 14353 answer published at November 14th 2022)

Q156 Beacon Scoring Scenario

Q: In reading GS14 b), Q34, and Q142 we have a question regarding this game scenario and if it would be legal. A single robot can only score 1 beacon but that beacon can be from your alliance partner. 1) Can we bring a "backup" beacon with a spot to fill in your alliance partners' team number and have it ready pre-match? 2) During the end game, we would make an attempt to score our beacon. If we fail to score ours, can we pick up the "backup" beacon to score it without a penalty? --Team 18474


https://ftc-qa.firstinspires.org/admin/report
Q329 Scoring Beacon with Cone

Q:
During endgame, our human player enters a cone into the substation, then stacks our beacon on top of it. The two objects are still separable if turned upside down - they are just stacked, not pushed down. In this scenario, are we able to pick up the cone and beacon as a single unit (controlling both as allowed by rule GS6a) and score both on a high junction at the same time, together. Does this count as 15 points (5 for the cone + 10 for capping with a beacon), or only 10 points (for capping)?

A:
The Score values are:

- **Cone** = Secured on the High Junction earns five (5) points.
- **Beacon** = Junction Ownership via the Beacon earns ten (10) points.

Total Score value for the Cone and Beacon is fifteen (15) points.

(Asked by 14503 answer published at February 7th 2023)

Q357 Grabbing cone through the beacon to score

Q:
Our beacon is a flexible TPU shell that encloses the beacon and is compliant enough that, when we grab and squeeze the beacon so that it compresses and we also grab the cone (picking up both at once), we can score them together. We know that we can pick up our beacon on a cone but can we pick up a cone with our beacon?

A:
Yes, provided that the Cone is not damaged.

(Asked by 5356 answer published at February 20th 2023)

Traditional - Competition Rules

Q145 Human Player - Possible to have two?

Q:
If we use a deaf student as a human player, our alliance team would be at a disadvantage as they would not be able to communicate with a deaf human player effectively. Can an alliance use two human players? The accommodation of allowing us to have two student human players instead of one human player would work the best in terms of reducing communication breakdowns between alliance teams during the match.

A:
Teams are allowed an interpreter at the field if one is needed. The interpreter is not allowed to manipulate scoring elements, control the robot, or to take over the role of any other members of the drive team. The team should work with event organizers as well as the Head Referee for these types of accommodations.

In the scenario described here and via email to FIRST, the use of a second human player would not be allowed.

The match schedules are provided to teams prior to matches starting which shows all teams who their alliance partners are throughout the competition. FIRST encourages all teams to strategize with their alliance partners prior to the matches beginning. Alliances may also confer in the queuing area to quickly determine the best strategies for scoring element placement prior to the match beginning.

An alliance should discuss topics such as robot design (to understand best scoring element placement for robot retrieval) and also ensure that the Human Player understands the rules outlined in rule GS13.

(Asked by 20250 answer published at January 24th 2023)

Q199 Share a team member to another team?

Q:
Hi, Another FTC team is requesting we share a member as they are short of drivers. Is it legal to do so. Thank you for your support in advance.

A:
There are no rules against a team member supporting more than one team. However, the event organizers will not adjust a match schedule to accommodate a conflict if both teams are scheduled for a match at the same time.

(Asked by 3781 answer published at December 14th 2022)

Q219 Elimination Match Interval

Q:
According to rule <C29c>, An Alliance has eight minutes (8:00) from the initial announcement or display of the Match results for their Robots to be set up on the playing field and ready for the start of their next Match. Is that the previously played match, or the previous match played by that alliance?

A:
The 8 minute interval is measured from the announcement of the scores from the previous match played by the alliance.

(Asked by 18380 answer published at December 13th 2022)
Q266 Playing audio from driver station

Q:
<DS08> Driver Station Sounds – Team initiated sounds via Team code and sounds not generated by the official Driver Station app are not allowed to be played through the Drive Station Android Device at any official Competition. My question is can usbl/usbc headphones be used with REV hub to provide audio feedback for one of our potential drivers? They're blind, and though we can add enough sensors for full arm and claw control, it wouldn't matter if there's no way to provide audio feedback.

A:
Accommodations and exceptions can be made for students with disabilities or extenuating circumstances. The use of headphones in the described scenario would be allowed. The team should work with event organizers as well as the Head Referee for these types of accommodations.

(Asked by 10755 answer published at February 2nd 2023)

Q280 Clarification on score dispute and what a team can ask a head referee.

Q:
Can you clarify what a team can dispute regarding their score? An alliance team member approached the head referee BEFORE the score was finalized because there were concerns that they had not been scored for completing the circuit. The Head Referee didn't answer the question and walked away. The final score was incorrect. What recourse do alliances have when they are not receiving the correct score? This is not the first time this season that scores have been incorrect.

A:
There is a time and a place to ask questions of the Head Referee. At the field and before the scores of a match are finalized is neither! C02 outlines the process for asking questions of the Head Referee.

All questions/challenges should be asked in the question box. They should be asked within 3 matches following the match in question.

The process is designed to move questions away from the field and to a time that does not interfere with the ability to reset the field.

There is no limit to what can be asked. Just remember to be gracious.

It is important to remember that the referees at an event have final gameplay and scoring authority during the event.

When you ask your questions, be prepared to provide specific information about what you believe was wrong. The head referee will, if they feel it is appropriate, confer with their crew and make a decision based on the collective input from the crew. Recognize that the decision of the head referee is the final decision.

One other item you may not be aware of is that the live scoring system freezes the scores on the field and audience displays once the scoring referees begin the final match review portion of their inputs. Frequently, there are changes to the final score based on inputs from the other referee (penalties, confirmed counts, etc)

(Asked by 19388 answer published at January 19th 2023)

Q287 Drive Team Requirements

Q:
Question 1: Is a drive team required to have two drivers, a coach, and a human player? Question 2: Could a drive team potentially consist of only one driver, no coach, and no human player? Note: Under "Drive Team Members Present," the Field Inspection checklist lists "Coach (required), Driver 1 (required); Driver 2 (optional)" and cites <C06>, but <C06> doesn't seem to have anything that would require a Drive Coach.

A:
Answer 1: No.

Answer 2: Yes. Keep in mind that a Human Player from one of the Two Teams on an Alliance is required if the Alliance intends to place Cones and/or Beacons into the Playing Field during a Match. Drivers and Coaches are not allowed to perform the Human Player actions described in rule GS13.

Note: You are correct, rule C06 does not support the requirement for the Field Inspection Drive Team to contain the specified membership. Teams with a Drive Team Coach and/or Human Player must have them participate in Field Inspection as specified on the Field Inspection checklist.

(Asked by 18209 answer published at January 24th 2023)

Q301 Drive team nametag

Q:
Is the drive team allowed to wear a nametag similar to this one https://www.amazon.com/dp/B07RBSZYWR during a match. It's an electronic programmable nametag that we can have the team name/number display on during the match.

A:
There is nothing in the rules that prevents this as long as it doesn't cause a distraction to volunteers or the opposing alliance.

(Asked by 12051 answer published at January 24th 2023)

Q308 One Robot per 2 teams

Q:
Hello! Is it possible to use one robot to participate in different competitions as 2 (or more) different teams? We tried to find the answer in the Game Manual but the only similar thing we have found is the rule <C05> in Game Manual, part 1. It says that the robot can't be built by another team. This rule also says that it's against the rules to use more than one Robot for one team. It seems to be against FIRST principles but we can't find the clear answer in any Game rules.

A:
Rule C05 d. would apply in this scenario. Teams may not use a robot built by another team for official competitions.

(Asked by 22222 answer published at February 2nd 2023)

Q321 Placement Order for Multi-Division event finals.

Q: <G13> handles placement order based on *Alliance* color in *Qualification Matches* (<G13>a) and based on higher-seeded *Alliance* in *Elimination Matches* (<G13>b). At a Dual *Division Event*, during inter-*Division* finals, the two *Alliances* may have the same seed. Which *Alliance* has the right to place second during inter-*Division* finals?

A: Alliances colors for inter-divisional finals are decided by a coin flip or a random selection of the scoring software. Robot placement should follow G13a in this instance.

(Asked by 2818 answer published at February 7th 2023)

Q333 Elimination Match Delay

Q: At our last tournament, during the finals match, after the 8-minute period, the refs asked if the teams were ready. A team had difficulty connecting and needed about 30 seconds to restart their robot. 1-Is this allowed? 2-Is this extra time allotment at the discretion of the ref? Or 3-if a team responds that they are not ready, does the match immediately continue? My concern is if a team is allowed to start troubleshooting, this provides an unfair advantage to that team.

A: The timing of when a match begins is at the discretion of the Head Referee in consultation with the FTA. The eight minute mark is to make sure the robots are on the field ready to go. In the case that robots that have technical difficulties, it is normal/expected that the FTA will provide support in an effort to keep all robots involved in the match. The amount of time taken in this intervention is up to the discretion of the Head Referee in consultation with the FTA.

(Asked by 5501 answer published at February 7th 2023)

Q362 Clarification on C05: legality of disabled Robots as visual aids

Q: <C05> states that each team may only enter one Robot into the Competition, which includes matches and judging. Teams often bring extra Robots (which might have passed inspection in a past event) with electronics removed, but it's unclear how these measures affect a robot's qualification as an entered Robot. Can an extra robot be used as a visual aid for judges/spectators if A. it is never powered on, B. the battery is removed, C. all wires are removed, or D. Control/Expansion hubs are removed?

A: A team cannot bring an entire second robot to a competition. If the team would like to show unique parts or mechanisms of the robot, and those mechanisms are not being used in the current competition, those may be brought to be used as a visual aide. Otherwise, teams can use pictures, video, or animations to show past iterations of their robot without needing to bringing a secondary robot.

(Asked by 8813 answer published at March 16th 2023)

Traditional - Field Setup

Q29 Verticality of poles at match start

Q: Is there any standard of how vertical a Junction pole should be at the start of a match beyond the Field Reset Guide saying that "Ensure each of the Low, Medium, and High Junctions are secured to the base. Make sure not to overtighten..."? Or should teams prepare for any range of angle? Can they ask to check if a pole is appropriately tightened?

A: Game Manual Part 2 - Appendix C states "The at rest vertical angle of the pole may vary from Match to Match and during gameplay." The washer at the base of the Low/Medium/High Junctions is 3" in diameter. If the top of the Junction pole is within the Junction Area it is within the tolerances. The note in diagram C-5 is intended to make teams aware that the pole tops will move, depending on the amount of flexing that takes place during a match and/or event.

If a Team feels the Playing Field is not set up correctly, Teams should notify a referee or field technical advisor prior to the start of the Match.

(Asked by 10723 answer published at October 3rd 2022)

Traditional - The Judging Process

Q229 Award criteria at regional championships

Q: What is the awards process for regional championships (including state)? Can teams that have not won an award previously submit or compete for an award at a regional (state) championship? Thank you.

A: A team does not have to win an award at an earlier tournament in order to be considered for judged awards at a later tournament. Every team is eligible to be considered for judged awards at every tournament where judging takes place. However, teams that have won the Inspire award at another event of the same level, regardless of region, cannot be considered for the inspire award or as an inspire award finalist at subsequent tournaments at that level.
Q241 Control Award Form Requirements

Q:
Are Control Award submissions required to be on the Control Award form found in Appendix J of the Judge's Manual? In the past 2 page forms designed on Canva or other graph design programs were allowed and we cannot find anything prohibiting that in the manual, not can we find anything allowing them specifically. Please clarify if judges can consider a control award submission where the first page is not a carbon copy of the Appendix J form.

A:
The control award submission does not need to be exactly that form, but it should be in that format. It would need to include all the same information asked for on the first page, and the submission can't be longer than 2 pages.

Traditional - Engineering Portfolio

Q134 Engineering Journal

Q:
The Game manual states that engineering journal is optional this year, and that the required item is the portfolio. If a team still creates an engineering journal will this be of any use to them in judging or will it purely exist as a reference document for the team to use while creating their portfolio.

A:
The judges may ask for additional information during pit interviews, but that information could be relayed verbally, shown via a cad file on a computer, shown as content in an engineering notebook, or in any other way. Teams who do not have an engineering notebook are not penalized. The engineering notebook is an excellent tool for teams to use as a reference when they build their engineering portfolio.

Q212 Pop up book style elements in Engineering Portfolio

Q:
Hi I have a team who would like to use some "pop up book" style elements in their engineering portfolio. I am hoping everyone is familiar with the pull tab---> see movement or spinning disk elements they are talking about. The only reference I found was 9.2.4 "b) The total number of pages for an engineering portfolio must not exceed 15 pages, plus a cover sheet for a total of 16 pages. i. Pages must be the equivalent of standard A sized paper (US 8.5 x 11) or Standard A4 sized paper (EU 210 x 29"

A:
Based on what is described, this would not be legal per the rules listed in section 9.2.4 of game manual part 1. Having a pull tab portfolio adds content that will exceed the limitations of the 15 pages plus the cover sheet.

Traditional - Advancement

Q178 Advancement, Game Manual 1, 6.0

Q:
After reading Game Manual 1, Section 6, I am unclear on whether a team can advance to two Regional Championships. In other words if a team qualifies at a Qualifying Tournament in region A, can they subsequently qualify at a qualifying tournament in region B? I understand that both Qualifying Tournaments in regions A and B would need to be among the first three Qualifying Tournaments that the team attends.

A:
A team can advance from two different qualifying tournaments in different regions to two regional championships in those regions. From the regional championship, a team may only earn one spot to the world championship tournament.

Traditional and Remote - Team Scoring Element

Q25 Beacon Design

Q:
We have designed a custom beacon that has a square base (3") and a round open top (2") with a nominal height of 3". The model lofts from a square to a conical top. Is this design legal (considering that the top part is conical)? Thanks. Ref: GM2:4.3 GM1:<TE06>

A:
It appears that this design can be clearly distinguished from a circular cone, therefore it is legal. However, I would suggest that you make the Beacon slightly larger than 3" square at the base and slightly taller than 3" so that you do not run into problems at inspection.

https://ftc-qa.firstinspires.org/admin/report
Q79 Clarification on TE06

Q:
Our team is looking for clarification on rule <TE06> COTS Scoring Elements – The Team Scoring Element may not resemble any current season’s COTS scoring elements. Our current design looks like a funnel, beaker, or Apollo re-entry craft. The base is an octagon as opposed to a cylinder. The heights are different and the sides are polygons. The geometry/science teacher in me says their design is fine, but someone outside those fields might say they are close.

A:
The intent of rule is to insure that the Referee scorers can clearly and quickly discern the difference between a Beacon and a Cone. A flat sided, octagonal cone is acceptable but simple, round funnel is probably too close. Adding additional features to the funnel would help to make it stand out from the Cones.

(Asked by 14840 answer published at October 21st 2022)

Q100 Clarifying - Team Scoring Element: <TE03> Size Constraints

Q:
TE03 states: "In other words, a Team Scoring Element must be small enough to fit inside a 4 inch x 4 inch x 4 inch cube and large enough to not fit in a 3 inch x 3 inch x 3 inch cube." A cubic object with size of 3.9"x3.9"x2" will fit inside a 4x4x4 box but not fit inside a 3x3x3 box (even diagonally.) Do we interpret TE03 correctly that this TSE is still legal since it will not fit inside a 3x3x3 box even though one dimension (x2") is smaller than x3" ?

A:
Rule TE03 clearly states that the minimum size of the Team Scoring Element is 3" x 3" x 3". The object in your question is not legal.

(Asked by 19746 answer published at November 1st 2022)

Q116 Beacon Size

Q:
Our custom beacon has a round base with outer diameter 4", and round top with 2". and the height of 4". The top and base are not straight lofts like a cone. It has 3 braces ribs connect top and base. Is this design legal (not sure if the 2" top is illegal)? Thank you! Ref: GM1:<TE03>

A:
There has been some confusion as to how a Beacon should be measured. The Beacon should be placed in a self-supporting position, that means it is not held at an odd angle by another object, such as the Beacon measuring tool. If, in any of the possible self-supporting positions, the Beacon meets the size requirements (larger than 3" x 3" x 3" and smaller than 4" x 4" x4") and it is visually distinguishable from a Cone, then the Beacon is legal. This design appears to meet those requirements. The 2" diameter top by itself does not make this design illegal.

(Asked by 19571 answer published at November 8th 2022)

Q124 Beacon design/shape

Q:
There is much debate at our first few league meets about beacons being too close to the shape of cones. We have teams using a red/blue plastic cup and just add tape to the outside to discern it as a beacon. Can it be merely a visible distinction using tape, or should the actual physical shape be different? Inspections would go a lot smoother if we have a clear yes or no to using a cup :-)

A:
A plastic conical cup, i.e Solo cup, is not allowed.

(Asked by 14568 answer published at November 8th 2022)

Q136 Double sided tape on inside of beacon?

Q:
While designing our beacon, we were looking through GM1 and thought of the idea of using double-sided tape on the inside of the beacon to allow it to attach better to the cone as we delivered it to the playing field. We would place a cone, then drop the beacon onto the cone, and the tape would help the beacon stay on the cone as we delivered it. It doesn' damage the cone in any way so in our eyes it should be legal but wanted to confirm.

A:
There is strong possibility that the tape will transfer adhesive to the Cone thus changing its properties for the next team that has to use it. This would be considered Field Damage per rule G26 and would result in a penalty. Please find another method to secure your Beacon.

(Asked by 8693 answer published at November 15th 2022)

Q146 Beacon orientation at inspection

Q:
Must a beacon be in any particular orientation to pass inspection? If a beacon meets size requirements in ONE, but not EVERY orientation, does it meet the size requirements?

A:
The Beacon must be in a self-supporting orientation when measured for size. If there are multiple self-supporting orientations, only ONE of the orientations needs to meet the size requirement for the Beacon to be legal.

(Asked by 16597 answer published at November 17th 2022)
Q153 Beacon Color

Q: In GM2, rule GS14 part C states: "A Beacon’s color must correspond with the Alliance in order to be used by that Alliance. If the color does not correspond, it cannot be used." Does this mean the whole Beacon, or just the majority. We want to make the top half neon-yellow so that it is easier to see from a distance.

A: GS14C is not the only rule discussing the Beacon's color. Rule TE01 in Game Manual Part 1 states "The predominant color of a Team Scoring Element must match the Team's assigned Alliance for the Match (red or blue)." The word "predominant" is key here so that the teams and the audience can easily associate the Beacon with the Alliance. This means the majority of the Beacon must be red or blue. As a word of advice, we suggest at least 70% of the Beacon be red or blue. Half of the beacon being neon yellow would not be acceptable.

(Asked by 19368 answer published at November 17th 2022)

Q154 Beacon Similarity

Q: If we had a conical cup of the right measurements covered in a nonslip fabric for rugs (the foamy ones in mesh patterns) and spray painted in the correct color would it be visually distinct from the cones? If not, how much would we need to change for it to be legal?

A: A circular cone shaped cup covered with a fabric or other material is not sufficiently different from a Cone and is not legal. Designing and fabricating a legal Beacon is a task for the Teams.

(Asked by 16643 answer published at November 20th 2022)

Q185 Can we provide a beacon to our alliance partner to use after passing re-inspection

Q: We have read Q156. Would like further clarification. According to rule I10, team supplied elements need to pass re-inspection prior to the game if they are changed after initial inspection. If a team brought a spare beacon and put their alliance partner’s number on it, would it be legal for the alliance team to use that beacon in game if the alliance team goes through re-inspection?

A: No, this request is beyond the intended scope of re-inspections performed after qualification Match play begins at an event.

Section 7.4 in Game Manual Part 1 states in part that "the Beacon is an optional Team designed and manufactured Scoring Element." The Game Design Committee's intent is that the Robot, Beacon, and Signal Sleeve are all designed and manufactured by the Team that brings them to the Playing Field for a Match.

(Asked by 13356 answer published at November 29th 2022)

Q186 Beacon shape and material to be used

Q: 1. Can a cylinder of 3.5 diameter and 3.5 inch height be considered a valid beacon? 2. Can the beacon bend little bit when being picked up by the claw? Or does it have to be sturdy? Thank you for your help

A: Answer 1: Yes

Answer 2: Yes, provided that when the Beacon is released by the Robot (i.e., Capped a Junction) it satisfies the size requirements described in Game Manual Part 1, rule TE03.

(Asked by 16502 answer published at November 28th 2022)

Q216 A scored “skinny” beacon is not seen by the referee crew

Q: Our team designed a “skinny” beacon so it can be easily placed by the human player onto a cone in the substation. When the cone and beacon combination is scored on a junction, it can be difficult to see the beacon. We are concerned the referee crew may not always see our scored beacon. Question 1: What happens if the referee crew doesn’t see the scored beacon? Question 2: What happens if the referee crew doesn’t see the beacon and the opposing alliance scores their cone over over our beacon?

A: Answer 1: Referees record Scoring task achievements and apply game rules based on gameplay that they see. A Scored Beacon that is not visible to the referee crew has zero Score value, does not convey Junction Ownership to the Alliance, etc. The Match will be scored as if the obscured or difficult to see Beacon does not exist. Simply stated, if a referee didn’t see it, it didn’t happen.

It is the Team’s responsibility to follow the guidance stated in Game Manual Part 1 rule TE01: "The purpose of this [Beacon color] rule is to ensure that field personnel, Teams, and the audience can easily associate Team Scoring Elements [Beacons] with their corresponding Alliance." The Game Design Committee's intent for this statement is that Beacon designs need to be readily visible with sufficient color surface area to be easily seen.

Answer 2: Same as answer #1. The playing field is scored based on what the referee crew is able to see from their normal locations outside the Playing Field. If a referee didn’t see the “skinny” Beacon, the Playing Field is scored as if the Beacon does not exist.
Q221 Additional clarification on the custom beacon sizing

Q: Hello, there is still confusion on the sizing of the Team Element. Q188 seems to state that a custom TSE must be over 3" in all 3 directions. However Per <TE03> In other words, Team Scoring Element must be small enough to fit inside a 4 inch x 4 inch x 4 inch cube and large enough to not fit in a 3 inch x 3 inch x 3 inch cube. At the events we have seen rings and other such that will not fit in the 3" cube but are not 3" in the height measurement. Please clarify

A: We believe Q116 ([qa/116]) and Q146 ([qa/146]) answers your question. Also, search for the keyword "Beacon" in this forum to find several other posts about Beacon size that may enhance your understanding of measuring Beacon size. If the previous answers in this Q&A forum do not answer your question, please rephrase your question and resubmit.

The short answer to your question is that a Beacon must be self-supporting in the measurement tool and satisfy the minimum and maximum size requirements in this one orientation. A Beacon that does not comply with the size requirement rule TE03 in Game Manual Par1 and the additional guidance provided in this Q&A forum should not pass inspection.

(Asked by 9225 answer published at December 12th 2022)

Q236 Pushing down on a Team's Beacon During Endgame

Q: During endgame if the human player places a cone into their substation and then places their beacon onto that cone, is the human player allowed to push down on the beacon in order to ensure the beacon is fully seated on the cone? For some teams their beacon hangs onto the cone through friction, and thus pushing down on the beacon is needed to ensure a proper fit.

A: Pushing the Beacon down onto a Cone violates rule G29 for illegal use of Game Elements; the pressed connection is viewed as an attempt to use the Beacon to make the task of Scoring the Cone+Beacon combination easier.

Also, a rule G26 violation for damage to the Cone is possible, depending on the circumstances.

Note: The recommend method for placing a Beacon onto a Cone In the Substation is for the Human Player to drop the Beacon onto the Cone. Otherwise, there is risk of concurrent Human Player, Beacon, and Cone contact that could cause illegal movement of a previously placed Cone.

(Asked by 11212 answer published at December 20th 2022)

Q237 Silicone Material on the inside of our Beacon

Q: On the inside of our flexible beacon we painted a thin layer of Specialty Resin's Cast-A-Mold 25T Tin Cured Silicone Rubber. The referee was concerned it may not be an allowed material. The purpose of this material is to increase the coefficient of friction between the outside of the cone and our beacon. It doesn’t leave a residue or break off onto the cone. Is this material a legal substance on the beacon?

A: This silicone material is allowed but if it flakes off or contaminates the field, Teams maybe penalized for field damage.

(Asked by 13415 answer published at December 22nd 2022)

Q238 Forcing a Beacon on a Cone Clarification

Q: The referee has told us that they will turn the cone/beacon over at the end of a match to determine if the beacon was forced onto the cone. When our beacon is first placed onto the cone you can turn it upside down and it will fall off, but once the robot places it on the high junction and it impacts the ground, it is pushed farther down on the cone and no longer falls off when turned upside down. Is there any reason why our beacon shouldn’t be allowed or should result in a penalty?

A: The post Match test described in the question should not be performed. If it is performed, no Penalty consequences should be levied based on the results.

Based on the limited information contained in the question. There is no obvious reason "why our[/your] beacon shouldn't be allowed or should result in a penalty."

Note: Rule G26 would come into play if visual inspection of the Cone shows qualifying damage that is directly attributed to the Beacon.

(Asked by 13415 answer published at December 20th 2022)

Q239 Can a beacon expand or contract beyond the team scoring element size constraints?

Q:
Can a beacon expand or contract beyond the team scoring element size constraints during gameplay, so long as it was legal during inspection and returns to within the size constraints when scored? Our teams planned beacon changes shape when grasped by the robot but returns to it's starting shape (using spring or surgical tubing) when released.

A:
Yes, provided that:

1) When the Beacon is released by the Robot (i.e., Capped a Junction) it satisfies the size requirements described in Game Manual Part 1, rule TE03; and
2) During inspection, the Beacon when placed in a self-supporting position in the measuring tool, meets the size requirements (equal to or larger than 3" x 3" x 3", and no larger than 4" x 4" x 4").

(Asked by 18634 answer published at December 20th 2022)

Q297 Clarification on rule 7.4 <TEO6>

Q: For the design of the team signal sleeve, would simply printing one out using three lines in colors similar to the default signal sleeve design for each orientation be considered to be too closely resembling the default signal sleeve? For instance, the default has three sets of four yellow lightbulbs, would using a design that is just three horizontal yellow lines considered to be too closely resembling the lightbulb design?

A: This sounds like the type of similarity that is intended to be disallowed in TE06 ... i.e. the images too closely resemble the default images.

As a guide, if the images on your signal sleeve are correctly recognized by the default model in the SDK, they are likely in violation of TE06

(Asked by 8271 answer published at January 25th 2023)

Q388 Legality of Beacon?

Q: Our team has come up with a beacon that is designed to push horizontally onto the Junction poles rather than going over the top of them. The beacons are equipped with two flexible "doors", shaped to guarantee they close so that the beacon completely surrounds the circumference of a Junction pole as described in the GM2 definition of Cap/Capping. The beacon has been accepted at multiple state level competitions, but we would like to request a ruling as to its legality before Worlds.

A: Providing the Beacon meets all the other requirements, this type of Beacon is legal.

(Asked by 7842 answer published at March 30th 2023)

Traditional and Remote - Signal Sleeve

Q8 Does the team supplied signal sleeve get inspected?

Q: Per game manual part 1, there's requirements for the signal sleeve that teams would need to comply with. However, there's no mention of the signal in the inspection checklists. I teams need to present their signal during robot inspections?

A: Yes.

(Asked by 8695 answer published at October 4th 2022)

Q88 Clarification on definition of images in <SS02>

Q: Please clarify the definition of 'image' as it relates to <SS02>. For example, can an 'image' be anything from a team logo to a pattern of dots to a photographic image to a barcode or QR code or anything similar as long as the 'image' in no way resembles the current season's signal image or COTS game elements and fits within the designated areas on the template?

A: An image is "a physical likeness or representation of a person, animal, or thing, photographed, painted, sculptured, or otherwise made visible." The examples you specified in your question are valid with respect to the constraints you also listed.

(Asked by 11129 answer published at October 25th 2022)

Q117 Signal Sleeve Images <SS7.5>

Q: For the images we create on the signal sleeve, can we use one large image or are we required to use three smaller images like the original supplied signal? If we can use just one large image, can it take up most of the space on the template or does it need to have a large amount of white space around it?

A: Images may be placed only in the three allowed white spaces in the template. The rest of the template must remain as is.

(Asked by 18119 answer published at November 9th 2022)
Q118 signal sleeve

Q: can we use just colored boxes for the signal sleeves?

A: Yes, Teams may place colored boxes in any of the three trapezoidal shaped spaces on the template. The space outside the three white spaces must remain as is.

(Asked by 14382 answer published at November 8th 2022)

Q131 Signal Sleeve Images <SS7.5>

Q: We asked Q117. We understand we have to keep our images to within the defined area of the template. What we needed to know was if we can fill that defined area with with a solid color or we have to have a smaller image (or images), only placed in the defined area. At inspection for our last meet judges were rather unsure about what was acceptable. Q118's answer only makes this more confusing as it is not clear if you mean an image of 3 small boxes or a solid fill of the defined area is okay.

A: Sorry for the confusion. Teams may put any image in the trapezoidal area, including filling the entire space with a solid color, pattern, etc.

(Asked by 18119 answer published at November 10th 2022)

Q275 Team number on sleeve.

Q: We were told that the team number on the sleeve can not be handwritten. Is this true?

A: That is correct. Rule 7.5 states "The intent is for Teams to add custom images and Team Numbers to the Signal Sleeve template and print their customized Signal Sleeve ahead of time. Add-ons after printing are not allowed." Writing a team number on after printing is considered an Add-on. Teams may hand write a number on the template then scan the template and print out the sleeve.

(Asked by 4327 answer published at January 18th 2023)