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 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 in 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)."
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*22*18 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 it 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.

(Question 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.

(Question asked by 12051, answer published at November 22nd 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.
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.

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.

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). Other 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.
Traditional and Remote - Commercial Of The Shelf Components

Q5 Are motor controllers illegal?

Q: 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.

A: Beyond the REV Control Hub and REV Expansion Hub, there is exactly two legal motor controllers listed as allowed in RE08 and RE09, The REV Robotics Spark Mini Motor Controller and the Vex Motor Controller 29. All other motor controllers are not allowed.

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

Q19 Axon Robotics Odometry Module legality

Q: 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

A: This part violates rule RM02 and is not legal.

It is the intent of FIRST to encourage Teams to design their own mechanisms rather than buying pre-designed and pre-manufactured solutions to achieve the game challenge. Purchased mechanism kits (for example, grippers) that violate the single degree of freedom rule, either assembled or requiring assembly, are not allowed. COTS drive chassis (for example, AndyMark TileRunner, REV Robotics Build Kit) are allowed provided none of the individual parts violate any other rules. Holonomic wheels (omni or mechanum) are allowed.

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

Q31 Reaffirmation of Intel D435 Distance Camera

Q: 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

A: Due to the usage of an infrared laser to project a grid of dots within the camera field of view, this depth camera is not allowed per RE13.a
Q52 Are preassembled non-robotic slides allowed?

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

A:
Yes.

(Asked by 4348 answer published at October 11th 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 12978 answer published at October 6th 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 19832 answer published at October 10th 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=30894109392930 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.
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.

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 it 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 outer 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/traction 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)

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 (/qa/5)] 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 Through Bore Encoder they appear to comply with Rule: <RE12> Sensors

A: Please see the answer to [Q97 (/qa/97)].

(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)

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/gxXQM54 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 21226 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 rules 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)

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 Modern Robotics/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.

(Asked by 11329 answer published at October 15th 2022)
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 allowed for servo configuration, but not as a part of a robot.

(Asked by 10383 answer published at October 24th 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)

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 LED

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

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

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 be able to perform all actions wirelessly on the Control Hub the same as if it was connected via USB-C.

(Asked by 18738 answer published at November 17th 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.
Traditional and Remote - Sensors

Q11 Is the OctoQuad Encoder Sensor legal?

Q:
https://www.tindie.com/products/digitalchickenlabs/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 22850 answer published at December 13th 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 17160 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 questions 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).

(Asked by 6165 answer published at November 29th 2022)

Q155 Passive self-made electronic system

Q:
Are we allowed to use passive self-made electronic sytem as a senor? 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

(Asked by 17504 answer published at November 17th 2022)

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 it 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.

(Asked by 21376 answer published at November 29th 2022)

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.

(Asked by 20771 answer published at November 29th 2022)

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 programatically 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.

(Asked by 5155 answer published at December 7th 2022)

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

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

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 - 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 descoring 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 descoring any Scored Beacon from a Junction during the End Game.

(Asked by 19591 answer published at September 28th 2022)

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.

(Asked by 5386 answer published at October 6th 2022)

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 panelty? 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.

(Asked by 21229 answer published at October 3rd 2022)
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.

(Asked by 16597 answer published at October 3rd 2022)

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 will 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/dxNOv5.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.

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

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”.

(Asked by 20245 answer published at October 18th 2022)

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.

(Asked by 18838 answer published at October 26th 2022)

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.

(Asked by 18597 answer published at October 31st 2022)

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?


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.

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

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.

(Question asked by 16433, answer published at November 7th 2022)

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.

A:
Answer 1: Yes.

Answer 2: Yes, the Human Player may step in/enter the area between the Driver Station and the adjacent Playing Field Wall while placing a Scoring Element In the Substation, provided that it is done safely.

(Question asked by 14568, answer published at November 7th 2022)

Q120 Is it legal to hold one and touch another cone?

Q:
When using separate extended intake and outtake mechanisms, is it legal for the intake to touch one cone in the substation in driver-controlled or cone stack in auto, while the outtake is holding/scoring another cone into the junction?

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 GS8a to gameplay.

The Robot's actions in the scenario are allowed if the Robot only Controls or Possesses one Cone at a time. The referee watching gameplay is the only person that can definitively make this determination. A Robot using the strategy described in the question should make it easy for a referee to determine when a Cone is Possessed or Controlled. Otherwise, rule GS6a consequences will likely apply.

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.

(Asked by 12611 answer published at November 7th 2022)

Q122 Clarification about Scoring Areas for rule G6

Q:
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.

(Asked by 10723 answer published at November 7th 2022)

Q138 Does a claw with a bigger hole than Junction pole considered as grasping?

Q:
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.

(Asked by 19571 answer published at November 15th 2022)

Q148 G29 intent- junction/cone sensors

Q:
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? (ie. 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.

A:
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 in 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 Robot is protected form receiving the previously referenced rule GS6 Penalties.

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

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. Is 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 (2.54 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 posses 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)

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)).

(Asked by 9929 answer published at September 28th 2022)

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 team 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" refereeing 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 routine 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.

(Asked by 19498 answer published at November 22nd 2022)

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.

(Asked by 8693 answer published at November 22nd 2022)

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.

(Asked by 5356 answer published at December 1st 2022)

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 in 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" can 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 it 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 or 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)

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 back 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? If 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.
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.

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.

(Asked by 12978 answer published at October 3rd 2022)

**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

(Asked by 7462 answer published at October 11th 2022)

**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 referee at your event, with the final call made 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.

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 core 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 once 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 G28 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 de-scoring 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 began 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
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, GS8, 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)

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

Answer 2: The question is not applicable, the "backup" beacon described in question #1 is not allowed.

(Asked by 18474 answer published at November 17th 2022)

Traditional - Competition Rules

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)
Traditional - Field Setup

Q29 Vertically 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? (asking as coach and event volunteer)

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.

(Asked by 15358 answer published at December 14th 2022)

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.
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 and refer to when they build their engineering portfolio.

(Asked by 8271 answer published at November 10th 2022)

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.

(Asked by 20077 answer published at December 14th 2022)

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.

(Asked by 18438 answer published at November 28th 2022)

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.

(Asked by 18738 answer published at October 4th 2022)

**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 a 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**

---
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't 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.
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.

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.

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 got it pass re-inspected per rule I10?

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.
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.

Note 1: It is highly unlikely that a discussion with the Head Referee in the question box will change a final Match score because a "skinny" Beacon was not seen by the referee crew.

Note 2: Beacon inspection does not include a visibility test and we are not going to add such a test. A Beacon that passes inspection can still be difficult for the referee crew to see, depending how it is used during gameplay. Just like a legally constructed Robot can use an assembly in an illegal way (e.x., grab a Junction pole), a legal Beacon that is difficult to see, may not be counted as Scored.

Pro Tip: Design a Beacon that is highly visible when Scored on a Junction. Make it easy for the referee crew and the other Drive Teams to see.

(Asked by 1000 answer published at December 7th 2022)
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, 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. <-- 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)

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. Do 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)