Forum Answered Questions - Traditional
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Stuck

General Robot Rules
09-22-2020, 10:52 AM

Answers to questions about General Robot Rules.

Tags: None

10-20-2020, 08:31 PM
This reply by Broadway Joe has been deleted by Broadway Joe

10-20-2020, 08:29 PM

Launching Distance

Originally posted by FTC12533

Rule <RG08> in Game Manual Part 1 states that “Teams must only launch the elements with enough velocity to score”, and that if a robot is deemed to be launching with too much velocity, they should be re-inspected and that “Robots must then show that a launched scoring element cannot travel in the air more than a 16 ft. (4.88 m) distance or more than 5 ft. (1.52 m) in elevation”. Noting that this game requires the rings to be launched in the launch zone, this means that some positions on the field, when being shot from, will be in violation of the 16ft rule (as shown in https://www.reddit.com/r/FTC/comment...me_renders_of/).
Q1: Noting that this game requires rings to be launched with high velocity and spin, does the rule limit the construction of the robot so that it could not possibly launch further than 16 feet?

Q2: In addition, with many teams competing in remote events, where inspection will be just an honesty check, to what extent will <RG08> be enforced this season?

A1: If a Referee feels the Robot is Launching rings in excess of the requirement, then Teams must demonstrate that the Robot as configured, cannot Launch Rings exceeding the limits imposed by <RG08>.

A2: There will be no checks of Robots that compete in Remote events. We are relying on Teams to be honest and to follow all the Rules. At traditional events, Rule <RG08>, along with all the other rules will be strictly enforced.
Stuck

Commercial Off the Shelf Components
09-22-2020, 10:53 AM

Answers to questions about Commercial Off the Shelf Components.

Tags: None

BROADWAY JOE
Game Design Committee Member
Join Date: Sep 2010 Posts: 943

10-26-2020, 02:21 PM

PITSCO Motor 385

Q:

Originally posted by FTC10095
Is a PITSCO Motor 385 an allowed DC motor? We were not sure if this is considered a Tetrix motor (listed as legal under the rules).

A: No, this is not a legal motor.

Last edited by Billie Jean; 10-29-2020, 02:36 PM.

BROADWAY JOE
Game Design Committee Member
Join Date: Sep 2010 Posts: 943

11-17-2020, 01:07 PM

Universal Joints

Originally posted by FTC12533
Q: What is the legality of universal joints, specifically the gobilda universal joint? (https://www.gobilda.com/4003-series---to-6mm-d-bore/). Universal joints were ruled legal in a forum post last year and we wanted to verify that they were still legal.

A: Yes, universal joints are legal.
Miscellaneous Robot Electrical Parts and Materials

09-22-2020, 11:40 AM

Answers to questions about Miscellaneous Robot Electrical Parts and Materials.

Tags: None

Stuck

Billie Jean
Senior Member

Join Date: Nov 2013
Posts: 217

09-22-2020, 11:40 AM

Answer: Yes. Be sure to have a circuit diagram for the PCB and be prepared to discuss/describe/explain the PCB to inspectors at your events (if attending Traditional Events)

Originally posted by FTC14470

Subject: Interconnect Only PCB

Question: Hello!

I believe this is allowed based on previously asked questions, but wanted to make sure. Is a custom PCB that has no electrical components on it besides connectors that is used strictly to connect things like motors, encoder, sensors, etc. allowed?

A similar question is asked here: https://www.firstinspires.org/sites/...-questions.pdf
(use ctrl + f and type "pcb" to find it)

Answer: Yes. Be sure to have a circuit diagram for the PCB and be prepared to discuss/describe/explain the PCB to inspectors at your events (if attending Traditional Events)
Subject: Robot Controller Phone LED Light

Question: Game manual part 1 <RE13> neither explicitly allows nor disallows use of the camera flashlight. It can be helpful with computer vision tasks. Rulings regarding its use in prior seasons have been:

2017-18 -- allowed
2018-19 -- initially disallowed, then allowed
2019-20 -- allowed

Will use of the camera flashlight be allowed for the 2020-21 season?

Thank you.

Answer: Yes, the LED built in to the robot controller phone may be used as a light source.

Subject: USB Control of LED strip


Answer: In short, No. An I2C to SPI bridge would be acceptable. The USB to SPI bridge to control the LEDs violates RE13.c
Motors and Servos

09-22-2020, 11:40 AM

Answers to questions about Motors and Servos.

Tags: None

Billie Jean
Senior Member

11-10-2020, 01:09 PM

Originally posted by FTC9999

Subject: Servo Power Module Device Limits

**Question:** Section 7.2.1 [Robot Technology Definitions] of Game Manual Part 1 defines a **REV Servo Power Module** as

"An electronic device that boosts the power supplied to 3-wire servos. A REV Servo Power Module has 6 input servo ports and 6 matching output ports. It draws power from a 12V source and provides 6V power to each output servo port. A REV Servo Power Module can provide up to 15A of current across all output servo ports for a total of 90 Watts of power per module."

The stall current of the VEX EDR 393 is rated as 3.6 amps at 7.2 volts (or 3 amps at 6 volts), but when connected to the VEX "Motor Controller 29" the stall current is limited to 3 amps at 8.5 volts (or **2.2 amps at 6 volts**).

The stall current of the goBILDA 2000-0025-0002 (25-2) servo is rated as 3 amps at 7.4 volts and **2.5 amps at 6 volts**. Thus, teams are allowed to power six (6) goBILDA 25-2 servos from a single REV Servo Power Module (SPM).

Even though teams are allowed to power six (6) goBILDA 25-2 servos...
Answer: Thank you for the thoughtful analysis. We do not plan to make any changes to the Servo Power Module limits for this season.

per SPM, and even though the VEX 29/393 draws less current at stall than the goBILDA 25-2, teams are only allowed to power two (2) VEX 29/393s per SPM.

Like most teams, after the season is over our competition bot becomes an outreach bot. Since the SPM can safely power six (6) VEX 29/393s we reduce the number of SPMs on the bot from the 5 to 7 required for competition to at most 2 SPMs as allowed by the specifications. We use the 4 to 5 SPMs recovered from the previous season’s bot on next season’s competition bot so that the team need not have to purchase any more SPMs than necessary in the long run.

Nevertheless, in the interests of reducing congestion, debugging complexity, and points of failure on a competition bot, we request that the restriction of two (2) VEX 29/393s per SPM be removed. As with any other servo, the SPM’s over-current shutdown feature will safely inform teams in the event the team miscalculates the max current draw of the mix of servos, VEX and non-VEX, connected to any given SPM.
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**Billie Jean**  
Senior Member  

**Join Date:** Nov 2013  
**Posts:** 217

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**Control System**  
09-22-2020, 11:41 AM

Answers to questions about the Control System.

**Tags:** None

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**Pierluigi Collina**  
Game Design  
Committee Member  

**Join Date:** Sep 2010  
**Posts:** 1095

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Originally posted by **FTC12533**

**Subject:** External Mechanisms Attached to Gamepads

**Question:** Are external attachments to legal controllers, such as this 3D printed joystick that snaps onto an Xbox 360 controller legal? This attachment does not directly modify the controller in any way.

**Answer:** Yes.

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Originally posted by **FTC12533**

**Subject:** 3rd-Party Gamepads & Gamepad Modifications

**Question 1:** Is a modified PS4 controller, such as those from:
Question 1: Is this officially sold PS4 back button: https://direct.playstation.com/en-us...4aAuebEALw_wcB legal?

Question 2: Are purely aesthetic button and shell mods legal?

Answer 1: No

Answer 2: No. Only the controller is allowed.

Answer 3: Modifications that do not require the disassembly of the Gamepad would be acceptable (painting, stickers, etc)
Billie Jean
Senior Member

Join Date: Nov 2013
Posts: 217

Answers to questions about Sensors.

Tags: None

Stuck

10-13-2020, 01:24 PM

Originally posted by FTC16626

Subject: Intel T265 RealSense Camera w/ 3rd Party VSLAM Library

Question: According to a reply by the GDC last season, the T265 was ruled legal as it is and can function solely as a UVC camera. https://ftcforum.firstinspires.org//...5207#post75207

Just as a quick summary, the Intel Realsense T265 camera performs VSLAM (Visual Simultaneous Localization and Mapping) allowing one to localize and get relative pose. It is not directly programmable and all the processing is done onboard.

Since then, a member of the FRC community has ported his T265 wrapper from FRC for FTC use (https://github.com/pietroglyph/ftc265). The camera transmits the pose data through UVC. The T265 still functions like a webcam. So no external USB/other connection is made. It just uses the same USB connection as any other webcam and transmits the same UVC data. It should be legal by all FTC standards.

Just wanted to re-establish legality on the Intel RealSense T265 for this season and clarify if extracting pose data from the UVC stream is legal. Essentially, are we allowed to use the T265 and that library specifically in competition for localization?
Answer: Yes. Make sure to pay attention to power needs ... the T265 likely needs to be plugged into a powered USB hub.

Note that in general, ruling from prior years do not automatically apply to the current season. It is always a good idea to ask via the Forum if/when there are questions about component legality.

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**Answer**: No. The ATtiny85 is inherently a programmable system and must be programmed at least once before it can be used. The limit on programmability is not a question of can it still be programmed, but rather of was it ever capable of being user programmed.

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**Answer 1**: Yes

**Answer 2**: Yes. Make sure to select resistor values appropriately! And
remember to have a simple schematic ready in case your robot inspector has questions!

**Answer 3**: n/a

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**Pierluigi Collina**  
Game Design Committee Member  
Join Date: Sep 2010  
Posts: 1095

*Originally posted by FTC8813*

**Subject: I2C Encoder Interface Device**

**Question**: As a follow-up item to the question about counting encoder pulses (quoted below), if one were to find a supplier of a legal pulse counter off-the-shelf, is it acceptable to use such a device with an encoder? The reason for asking is that there are only 8 encoder ports and i2c doesn't handle the pulse rate of typical encoders.

**Answer**: Under current rules, this would be considered in the bucket "Additional Electronics" and is not allowed.
Billie Jean
Senior Member

Gameplay – All Match Periods
09-22-2020, 11:47 AM
Answers to questions about Gameplay – All Match Periods.

Tags: None

Stuck

Air Jordan
Game Design Committee Member

11-16-2020, 07:20 PM

Originally posted by FTC12524

Subject: Rule <RG08> Launching Game Scoring Elements

Hello! We are FTC Team 12524 and we have a big discussion about <RG08> rule from the Game Manual Part 1. The rule states that Robots must show that a launched scoring element cannot travel in the air more than a 16 ft. (4.88 m) distance or more than 5 ft. (1.52 m) in elevation. The main problem is with the definition of the word “or”.

Referees at our today League Meet told that our shooter is not legal because Rings travel more than 16 ft with the elevation of 3 ft.

Question: So, the question is: Could a Scoring Element travel in the air more than 16 ft. if it doesn't elevate higher than 5 ft. Or both limitations should be respected for the shooter to be legal?

Thank you

Answer: A Launched Ring that travels in the air more than 16 feet violates rule <RG08>. A Launched Ring that travels more than 5 feet in elevation violates rule <RG08>.
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Billie Jean
Senior Member
Join Date: Nov 2013
Posts: 217

Pre-Match
09-22-2020, 11:48 AM
Answers to questions about Pre-Match setup.

Last edited by Billie Jean; 09-22-2020, 11:54 AM.

Tags: None

Air Jordan
Game Design Committee Member
Join Date: Sep 2010
Posts: 545

10-19-2020, 07:35 PM

Originally posted by FTC12533

Subject: Pre-Loading a Wobble Goal - Is Completely Supported by the Robot Allowed?

In Game Manual 2, rule 4.5.1, it states that the robot needs to pre-load the wobble goal at the start of the match. Looking at the definition of “pre-load”, it says that the robot only needs to be touching the game element. However, I feel like it is unclear on whether or not the wobble goal needs to also be in contact with the ground.

Question 1: Does the wobble goal need to be touching the ground at the beginning of the match?

Question 2: Can it be completely supported by the robot?

Answer 1: No
Answer 2: Yes
Originally posted by FTC9999

**Subject: Section 4.5.1 Pre-Match Robot Setup - Game Element Extension Outside the Playing Field**

<G4> [Robot Starting Volume] says "Before the start of a Match, the Robot in its starting location must not exceed a volume of 18 inches by 18 inches by 18 inches ... A Pre-Loaded Scoring Element may extend Outside the 18-inch cube volume constraint..."

**Question:** Since the Robot must be touching the Playing Field Wall at the start of the match, may a Pre-Loaded Scoring Element, such as a Wobble Goal or Ring, be partially extended over the Playing Field Wall and outside the Playing Field Boundary at the start of the Match?

**Answer:** No. Section 4.5.1.1.a in the Game Manual Part 2 - Traditional Events requires the Robot to be Completely Inside the Playing Field Perimeter. Rule <G4> states that Scoring Elements that are Controlled or Possessed by a Robot are part of the Robot. Therefore, Pre-Loaded Game Elements are required to be Completely Inside the Playing Field Perimeter when the Robot is setup for the start of a Match.

Originally posted by FTC9999

**Subject: Pre-Match Robot Setup - Does a Game Element Touching the Playing Field Wall Satisfy 4.5.1.1.b?**

Section 4.5.1 [Pre-Match/Starting Location] of Game Manual Part 2 (Rev 1.3) says "... a) Drive Teams must place their Robots and Possessed Scoring Elements, in any orientation, Completely Inside the Playing Field Perimeter. b) The Robot must touch the front facing Playing Field Wall. ..."

<G4> [Robot Manipulation of Scoring Elements] says "Scoring Elements that are Controlled or Possessed by a Robot are part of the Robot except when determining the location of the Robot or otherwise specified by a Game-Specific rule."

A recent ruling states that the exception "except when determining the location of the Robot" does not apply to section 4.5.1.1 [Pre-Match/Starting Location].

**Question:** Therefore, if the only part of the Robot touching the front facing Playing Field Wall is a Scoring Element Possessed by the Robot, is 4.5.1.1.b is satisfied?

**Answer:** No
**Subject: Operation of Motors and Servos during Pre-Match Setup**

**Question 1:** Are robots allowed to have motors and servos powered during initialization in order to fit within the 18 inch cube starting size requirement?

**Question 2:** Are teams allowed to manually operate motors and servos with the gamepad (such as pressing a button to activate a motor PID loop or move a servo) during the initialization period, in order to grasp game elements and/or ensure robot mechanisms are within the 18x18x18” sizing cube, provided that manual control would cease before randomization?

**Answer 1:** Yes, provided that the Robot is motionless while the Robot and Driver Station are in the required hands-off state before the start of the Match.

**Answer 2:** Yes, provided that the actions do not unnecessarily delay the beginning of a Match.
Autonomous Period
09-22-2020, 11:49 AM

Answers to questions about the Autonomous Period.

Tags: None

Stuck

09-29-2020, 09:38 PM

Originally posted by FTC2901

Subject: Ring Returns to the Playing Field After it Impacts a Power Shot Target

Question: During the Autonomous period, after the robot uses a ring to shoot down a power shot target, if that ring bounces back onto the playing field, is the robot allowed to shoot that ring again?

Answer: Yes

09-29-2020, 09:44 PM

Originally posted by FTC2901

Subject: Are Rings in the Starter Stack Eligible to be Scored during the Autonomous Period?
**Question:** During the Autonomous period, can the robot use rings from the Starter Stack to either shoot down Power Shot Targets for points or to score in the Tower Goal?

**Answer:** Yes. Keep in mind that the Ring Control/Possession limits described in rule <GS6> apply to all periods of gameplay.

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**Air Jordan**  
Game Design Committee Member  
Join Date: Sep 2010  
Posts: 545

10-28-2020, 12:48 PM  
#4

**Originally posted by FTC2901**

**Subject:** <G20> Parked at End of the Period - Unpowered Flywheel Motion

**Question:** Is it alright for a flywheel to continue on unpowered motion between the Autonomous and Driver-Controlled periods?

**Answer:** Yes

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**Air Jordan**  
Game Design Committee Member  
Join Date: Sep 2010  
Posts: 545

11-10-2020, 09:12 PM  
#5

**Originally posted by FTC8397**

**Subject:** Wobble Goal Target Zone Scoring - Playing Field Wall/Foam Tile Gap

Two of the three target zones (for a given Alliance Color), are located adjacent to at least one playing field wall. On most fields there is a gap of a millimeter or so between the floor tiles and the playing field wall. So a literal interpretation of the Game Manual Part 2 definition of "Completely In", would indicate that a wobble goal that contacts the perimeter wall is (in most cases) not completely in its target zone. We are uncertain whether it is intended that this strict interpretation be applied. The question below assumes a field that includes an allowed COTS playing field perimeter wall and tiles, and assembled according to the field setup guide.

**Question:** If a wobble goal abuts the perimeter wall (and for that reason may extend a few millimeters beyond the vertical plane of the wall-adjacent tape), but is otherwise located completely within its target zone, should it be considered completely inside of the target zone for scoring purposes?

**Answer:** Yes, in this scenario, the Playing Field Wall marks the border of the Target Zone Goal Area.
Billie Jean
Senior Member

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Driver-Controlled Period
09-22-2020, 11:49 AM
Answers to questions about the Driver-Controlled Period.

Tags: None

Stuck

Air Jordan
Game Design Committee Member

Originally posted by FTC13474
Subject: Ring Stuck in the Return Rack Question: During the Driver-Controlled Period, if a ring is placed by the Human Player in the Return Rack AND it gets stuck (does not fall out of playing field side), is the Human Player allowed to reach into the Return Rack to retrieve the stuck ring and attempt to return it again?

Answer: Yes

Air Jordan
Game Design Committee Member

Originally posted by FTC12524
Subject: Rule <GS9> Wobble Goal Constraints - Controlling an Opposing Alliance Wobble Goal
Hello! We are FTC Team 12524 and we have a question about Moving opposing Alliance Wobble Goal during the Driver-Controlled
Period.

Today at the Traditional Event we have a situation in a match. During the Driver-Controlled Period, before the start of the End Game, we moved the opposing Alliance Wobble Goal, that was neither in the Target Zone nor outside of Launch Zone, to the far corner of the Launch Zone. Rule <GS09> does not prohibit Controlling Opponents Wobble Goals in this case.

But Referees gave us a warning (with potential Yellow Card if the action will be repeated next time) for this, telling that this tactic is against the concept of Gracious Professionalism.

**Question:** So, the question is: is it allowed to take away the opposing Alliance Wobble Goals during the Driver-Controlled Period, before End Game, that are not completely in a Target Zone.

**Answer:** Yes, provided that no other rules are violated. The Robot's actions described in the question do not violate rule <GS09> and no warning should be issued.
Billie Jean
Senior Member

End Game
09-22-2020, 11:50 AM

Answers to questions about the End Game.

Tags: None

Stuck

Air Jordan
Game Design Committee Member

10-23-2020, 01:41 PM

Originally posted by FTC12789

Subject: Section 4.5.4.1 - Wobble Goal Delivery - Starting End Game Tasks

Question: As per Section 4.5.4, "End Game tasks started and/or completed prior to the start of the End Game will earn zero (0) points for those tasks." At what point is an End Game task considered "Started"? Specifically, I'm concerned about the Wobble Goal Delivery task. If the Robot were to pick up the Wobble Goal above 18 inches and be poised just outside the Launch Zone prior to End Game prior to End Game to make a beeline for the Barrier as soon as End Game started (or better yet timed it so that the robot is in motion but would not allow the Wobble Goal to cross into the Launch Zone until after End Game has started), is that considered "Starting the End Game Task" prior to End Game? All other rules up to this point can be considered to be faithfully adhered to.

Answer: The Robot actions described in the question are not starting the Wobble Goal Delivery End Game task early. A Possessed Wobble Goal that is Outside the Launch Zone or In a Target Zone when the End Game Period starts is eligible for the End Game Wobble Goal Delivery tasks.
Subject: Section 4.5.4 End Game Wobble Goal Rings and Rule <G29> Illegal Usage of Game Elements

In Ultimate Goal, it is possible to starve the Field of Rings very quickly during End Game with a well-built Robot by collecting Rings and placing them on a Wobble Goal and then storing more in the allowed storage within the Robot.

Question: During End Game, if a Robot can LEGALLY consistently collect all of the field's Rings within a VERY short period of time on a Wobble Goal, thus amplifying the difficulty for other Robots to score Rings in the Tower Goal, for example, would G29 possibly be invoked?

Answer: No

Subject: Ring Return to the Playing Field Path = Ring --> Return Rack --> Ring Completely Supported by a Wobble Goal

Question: We've been debating on whether or not this scenario is 100% penalty-free:

(1) During Endgame, the Robot brings a Wobble Goal to directly under the Return Rack.
(2) The Human Player feeds Rings through the Return Rack
(3) One (1) Ring somehow manages to fall perfectly onto the Wobble Goal such that it is perfectly skewered and supported by the Wobble Goal. Note that this Ring NEVER becomes directly supported by the Floor, as described per <GS6>(1)b.
(4) The Robot then grabs the loaded Wobble Goal, and drags it to the Start Line for additional points.

Since Support/Supported does not have the concept of "transitive support" included in the definition, the Rings are never actually supported by the floor (the Wobble Goal is supported by the Floor, but the Wobble Goal supports the Ring, so the Ring is supported by the Wobble Goal but not the Floor). Therefore, when the Robot controls the Wobble Goal the Robot is technically in control of a Ring that has not yet been supported by the floor, and should get a penalty.

However, if there is no "transitive support" allowed then there's another problem - only one ring in a perfect stack on the Wobble Goal can ever be fully supported by the Wobble Goal. If there are multiple rings, the ring on the bottom of the stack is fully supported by the Wobble Goal, but the ring above it is supported by the Bottom Ring, and not the Wobble Goal, and thus the second ring (and all rings
above it) cannot score.

However, if "transitive support" is definitely allowed, then it breaks the intent of <GS6>(1)b without a Robot exception - if a Robot catches a Ring coming out of the Return Rack, the robot is fully supported by the Floor so the Ring is technically fully supported by the Floor, too.

So which is it? I'm betting the whole "supported by the floor" sounded like an easy win, but transitive support is a stinker. <grin>

Thanks!

Answer: First of all, thank you for the very clear description of your thought process and the specific game manual references. The scenario described in steps 1 through 4 result in a violation of rule <GS6>(1)b. Rings returned to the Playing Field are required to be directly Supported by the Playing Field Floor before they are eligible to be Controlled by a Robot. If the subject Wobble Goal and Ring(s) are Controlled by a Robot, the Penalties described in rule <GS6>(1)b should be applied per Ring.
**Field Setup**

09-22-2020, 01:20 PM

Answers to questions about Field Setup and Assembly.

Tags: None

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**Big Red Machine**

Game Design Committee Member

10-21-2020, 12:05 AM

*Originally posted by jlevy2017*

**Subject: Exact placement of the Launch Line**

*Q: In the Field Setup Guide, page 12, the placement of the Launch Line is defined with "The front edge of the Launch Line should measure approximately 80" to the Audience Perimeter Wall".*

"Front edge" is not defined. Is it the edge closest to the Tower Goals, making the Launch Zone 80 inches in length, or is it the edge closest to the audience, making the Launch Zone 82 inches in length?

*A: The front edge of the Launch Line is the part of the tape that is closest to the Audience Perimeter wall.*

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**Big Red Machine**

Game Design Committee Member

11-05-2020, 04:51 PM

*Original text not shown.*
Q: To clarify: before each match begins, are all four rings in each stack to be placed on their respective spots, and does this happen before teams place robots on their field?

A: You place all four rings on their spots prior to the robots are placed and then adjust them after the randomization takes place as described in the Field Setup Manual as well as Game Manual Part 2.