2018-2019 FIRST® Tech Challenge
Forum Answered Questions

Presented By Qualcomm

www.firstinspires.org
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General Robot Rules - Answers

09-19-2018, 02:47 PM

Answers to questions about General Robot Rules can be found in this section.

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Ming the Merciless
Game Design Committee Member

10-03-2018, 11:08 AM

*Originally posted by* kstevens2017_1

**Linear Actuators**

**Q:** Is use of a linear actuator legal in FTC?

**A:** Linear Actuators are legal but they must be constructed by the teams themselves. Commercial Off The Shelf (COTS) linear actuators that contain more than one degree of freedom (rotation fo the motor and linear motion of the slide) violates <RM02> which states that "Purchased mechanism kits (for example, grippers) that violate the single degree of freedom rule, either assembled or requiring assembly, are not allowed".

---

Ming the Merciless
Game Design Committee Member

10-03-2018, 11:08 AM

*Originally posted by* kstevens2017_1
### Linear Actuators

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1 comment

**Ming the Merciless** commented

11-26-2018, 11:00 AM

*Originally posted by FTC5501

**Sizing during Hanging**

**Q:** There has been some discussion as to the sizing of the robot to start a match. If the robot when it is hanging hangs down at an angle due to the location of the hook will the sizing be taken in the orientation the robot is hanging.

For example, at inspection will the sizing box remain on the table in a level position with the bottom of the box parallel to the table and then the robot needs to be placed inside of the sizing box in the position it will hang? In the situation above the box remains level on the table but the robot has to be placed into it at an angle since that is how it is hanging or can the robot be placed into the box in a level position as well as to how it would sit on the field with all 4 wheels down?

**A:** Rule <RG02> states that the Robot must fit into an 18" x 18" x 18" cube. There is no requirement that the flat sides of the cube be parallel to the floor. As long as the Robot, when hanging, can fit inside the cube, it is legal. Some robots, when latched, may flex open. Teams must make sure that the Robot still fits into the cube in this flexed condition.
Tank Treads

Q: I don't see tank treads on either the legal or illegal parts list. Can my kids use these? We wanted to order the Tetrix Max Tank Tread Kit. Is that legal?

A: Yes, tank treads are legal but they are still subject to Rule < RG01>.

Hook on Rope

Q: If a robot were to use a hook at the end of a rope/string/tether on a pulley mechanism that was used exclusively for latching and deploying, would this be considered detached in violation of <G15>?

A: No this is not considered detached and is not in violation of rule <G15>. Remember that in designing your bot you may not violate other rules such as <RG08> or <RG01.d>.
Tweet

Originally posted by FTC13794

**Wedgetop Tread**

Q1: Is Wedgetop Tread (AndyMark Part number am-0522 illegal?
Q2: Is Green Grippy Tread (am-2611) illegal?

A1: Yes, Wedgetop tread is legal. However depending on how it is used, the weight of the robot, etc. the Inspectors may still require the bot to pass the test outlined in the Robot Inspector Manual. To summarize, the robot should be placed on top of a field tile and against an immovable surface (wall), the wheels will then be run at full power for 15 seconds. If there is any physical damage to the floor tile, the wheels are not allowed. Discoloration or black marks alone are not considered field damage.

A2: Yes, the Green Grippy tread is legal but is under the same restrictions as listed in A1.

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Originally posted by FTC5559

**Cheesecaking Mechanism**

Q: Are teams allowed to compete while using a mechanism built by another team?

For example: Team A has no way of landing and latching. Team B gives them a mechanism to attach to Team A’s robot giving them the ability to land and latch.

A: While FIRST encourages teams to help each other improve their robots, using a completed, specially designed mechanism designed and built by another team is not allowed. Cheesecaking, as it is commonly referred to, violates the spirit of the competition as well as rules <RM02> (COTS parts) and <T7> (bringing and using only one robot).
A: While FIRST encourages teams to help each other improve their robots, using a completed, specially designed mechanism designed and built by another team is not allowed. Cheesecaking, as it is commonly referred to, violates the spirit of the competition as well as rules <RM02> (COTS parts) and <T7> (bringing and using only one robot).

Q: Are teams allowed to compete while using a mechanism built by another team?

For example: Team A has no way of landing and latching. Team B gives them a mechanism to attach to Team A’s robot giving them the ability to land and latch.

A: Yes, providing the Team Number is clearly visible to field personnel from two opposite sides.

Q: <RG06>.b states that the team number must be visible from at least two opposite sides of the Robot (180 degrees apart).

Would having the team numbers back-to-back, for example on opposite sides of a flat board, be legal?

A: Yes, providing the Team Number is clearly visible to field personnel from two opposite sides.

Q: <RG06>.b states that the team number must be visible from at least two opposite sides of the Robot (180 degrees apart).

Would having the team numbers back-to-back, for example on opposite sides of a flat board, be legal?

A: Yes, providing the Team Number is clearly visible to field personnel from two opposite sides.
A: Yes, this is a legal placement but if access to the screen is partially blocked it may be difficult if not impossible for the FTA to assist your team if something goes wrong. Extra time will not be provided to teams whose robot Controllers are hard to access.

Originally posted by FTC5501

Phone Location

Q: We know that the phone must be visible to field personnel so we had a question based on phone location. Would it be allowed to place our phone behind our stored deposit mechanism whereas half of the phone is visible before the start of the match? When we press play the stored deposit mechanism would raise to the location that it would be in for the entire match which would then make the entire phone display visible throughout the entire match. Is this a legal placement?

A: Rule <RG02> states that the Robot must fit into an 18" x 18" x 18" cube. There is no requirement that the flat sides of the cube be parallel to the floor. As long as the Robot, when hanging, can fit inside the cube, it is legal. Some robots, when latched, may flex open. Teams must make sure that the Robot still fits into the cube in this flexed condition.

Originally posted by FTC5501

Sizing during Hanging

Q: There has been some discussion as to the sizing of the robot to start a match. If the robot when it is hanging hangs down at an angle due to the location of the hook will the sizing be taken in the orientation the robot is hanging.

For example, at inspection will the sizing box remain on the table in a level position with the bottom of the box parallel to the table and then the robot needs to be placed inside of the sizing box in the position it will hang? In the situation above the box remains level on the table but the robot has to be placed into it at an angle since that is how it is hanging or can the robot be placed into the box in a level position as well as to how it would sit on the field with all 4 wheels down?

A: Rule <RG02> states that the Robot must fit into an 18" x 18" x 18" cube. There is no requirement that the flat sides of the cube be parallel to the floor. As long as the Robot, when hanging, can fit inside the cube, it is legal. Some robots, when latched, may flex open. Teams must make sure that the Robot still fits into the cube in this flexed condition.
Gearbox Modification

Q: I know we can replace a motor's gearbox, but is it legal to modify the gearbox that comes on a motor? <RE15> says that (electronics) "may not be modified internally". However in the box underneath it says "Replacing gearboxes and/or changing gears" is an example of allowed modifications.

A: Yes, replacing gears is a legal modification.

Suction Cups

Q1: Could a suction cup be used to pick up a mineral? It doesn't seem to be a "closed gas device", unless it becomes one when it is sealed against the mineral.

Q2: In a related question, could we make our own air blower to create a low pressure in a tube to lift minerals? Again, it wouldn't be a closed system, but the pressure differential would be present due to the air being blown out of the tube.

Thanks for your guidance!

A1: Yes, providing the suction cup does not damage the Minerals

A2: Yes, providing the exhaust blower air is not constrained in any way that results in an increase in pressure.

Vertical Numbering

Q: Can a team's robot numbers be arranged vertically? Like:

```
1
0
0
9
```

A: No, this motor is not on the list of approved motors. See Rule RE09

Ming the Merciless commented
02-01-2019, 11:52 AM

Originally posted by FTC5064

**Contained Beans**

Q: For our team marker, we have purchased a stuffed animal. The feet of the stuffed animal are filled with beans/rice. The beans are contained within the fabric of the animal and are not loose and there is no way to spill the beans without cutting open the feet of the stuffed animal. RG01.h rules loose ball bearings, coffee beans, etc. illegal. Is this considered loose? Is having beans in this manner legal?

A: No, this is not allowed. If you wish to use the stuffed animal the beans must be removed and the marker must be stuffed with cotton or some other material that cannot spill out.
Stuck Commercial Off the Shelf Components - Answers

09-19-2018, 02:45 PM

Please be sure to read the Game Manual and the responses to other questions in the forum before posting. Thank you!

Tags: None

Ming the Merciless
Game Design Committee Member

10-03-2018, 11:12 AM

Originally posted by RedfishRobotics

Linear Actuator Kits

Some suppliers have begun offering "lift kits" to assist with the lander latching challenges (auton & end game). The kits in question generally use the rotation of a lead screw to move a lead screw nut attached to some linear extension such as an aluminum extrusion (80/20, Xrail, Etc.).

Q1: Does a kit that provides both rotational movement and X/Y movement (as described) violate RM02, which limits COTS kits to "A single degree of freedom".

Q2: Is the described kit more or less legal if it also includes an otherwise FTC legal motor or servo to rotate the lead screw?

A1: Yes

A2: The legality of the motor has no effect on the overall legality of the actuator.
The Game Design Committee has had a lot of inquiries regarding the use of linear actuators for this year's challenge. Normally we encourage teams to design and build their own mechanisms to solve the game challenges but on occasion we have allowed the use of COTS kits that provide additional capability to teams without ruining the robot design experience (for example: the TileRunner kit). Due to the overwhelming response from the FIRST Tech Challenge community, the GDC has re-evaluated the use of linear actuator systems with regard to Rule <RM02>. After discussing this issue with numerous resources and evaluating the effect on game play, the GDC has decided to allow the use of linear actuator kits.

There are a few conditions however:
1. This is a one-time exemption and not a blanket change in Rule <RM02>.
2. The linear actuators are limited to one direction of motion, no X-Y actuators.
3. The linear actuators must use legal parts, the motors used must be from the allowed motors listed in Rule <RE09>.

The GDC would like to thank all the teams that provided positive, helpful input to the decision-making process.

Last edited by Ming the Merciless; 10-11-2018, 11:12 AM.

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Q: I know there is a question and answer regarding the COTS systems from Servocity, but I wanted to know if all of the parts are purchased separately, can they be used for the team to build their system? If so, will there be any proof required during the robot inspection to verify these parts were purchased separately?

A: Yes

Q: Are small turnbuckles like the ones below legal for use as lift cable tensioners?
https://www.homedepot.com/p/Crown-Bo...7046/204273926

A: Yes
Linear rail and Actuator Kits

Q: We would like to ask about the legality of the following:

1- Is the cascading rail design from Servo City is legal to use? https://www.servocity.com/cascading-x-rail-slide-kit
3- Is the Linear kit V2 from REV Robotics legal to use? http://www.revrobotics.com/rev-45-1507/
4- Is the servo linear it from Servo City legal to use? https://www.servocity.com/785-gear-rack-kit-637171

A1: Yes
A2: Yes
A3: Yes
A4: Yes

Originally posted by FTC9819

Tank Treads

Q: I don't see tank treads on either the legal or illegal parts list. Can my kids use these? We wanted to order the Tetrix Max Tank Tread Kit. Is that legal?

A: Yes, tank treads are legal but they are still subject to Rule < RG01>.

Originally posted by FTC13438

Versachassis

Q: VEX is promoting a chassis kit. Is it legal for this season? https://www.vexrobotics.com/vexpro/f...ssis-mini.html
A: Yes, the VersaChassis Mini is legal per rule <RM02>.

Thank you,
13670

A: In a shock absorber, a moving piston forces air (or oil) through a series of small holes thus slowing the motion of the piston and absorbing energy. This restriction results in compressing the air and raising the internal pressure. Rule <RG01> does not allow devices that use compressed air in any form. Therefore this is not a legal COTS.

A: This ball caster is a legal COTS part.
Commercial Off the Shelf Components - Answers - FTC Forum

Originally posted by FTC12611

**Ball Caster with Bearings**

Q: Does this product violate "single degree of freedom"?
https://www.pololu.com/product/2692

This has ball bearings and can move in omni directions.

A: Yes, this ball caster is a legal COTS part.

---

Ming the Merciless
Game Design Committee Member
Join Date: Sep 2010
Posts: 913

Originally posted by FTC11479

**Servo Blocks**

Q: Is the Servo City servo block part # 637118 for quarter scale servos legal?
https://www.servocity.com/637118

A: Yes, this is a legal COTS.

---

Ming the Merciless
Game Design Committee Member
Join Date: Sep 2010
Posts: 913

Q: We have a question about materials we can use for our team marker. We would like to use either a Gold Mineral or Silver Mineral as a part of our team marker. Is that allowed?

Thank you![/QUOTE]

A: There is no rule restricting the use of Minerals as building materials for a Team Marker. However, it must be obvious to the Score Trackers and other Field personnel that these Minerals are part of the Team Marker, and not scored Minerals. If there is any confusion at all, the team will be asked to replace this Team Marker with a more suitable one.

---

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A: Yes, this is a legal COTS part.

---

**Phone Holders**

Q: Hello, we wonder if a smart phone holder would be legal to use in our robot, something like this [https://www.amazon.com/gp/product/B07W2S3UE5Y?psc=1](https://www.amazon.com/gp/product/B07W2S3UE5Y?psc=1)

A: Yes, phone holders are legal.

---

**AndyMark Gearboxes**


A: Yes, this is a legal single speed gearbox per Rule <RM02>.
Committee Member
Join Date: Sep 2010
Posts: 913

**Heim Joints (rod end bearing)**

Q: Are purchased heim joints, AKA rod end bearings, AKA rose joints a legal component? Here is an example: https://www.speedwaymotors.com/Stand...Hole,9803.html

Thanks!

A: Yes, a rod end bearing is a legal COTS part.

---

Ming the Merciless
Game Design Committee Member
Join Date: Sep 2010
Posts: 913

12-04-2018, 12:21 PM #16

Originally posted by FTC10095

**Rack and Pinion**

Q: Is the TETRIX Max Rack and Pinion kit an allowed part this year under the exception to <RM02>? https://www.pitsco.com/TETRIX-Rack-a...ear-Slide-Pack

A: Yes, Rack and Pinion kits are legal COTS parts.

---

Ming the Merciless
Game Design Committee Member
Join Date: Sep 2010
Posts: 913

12-09-2018, 04:00 PM #17

Originally posted by FTC7171

**Lander Support Bracket**

Q: Are the lander support brackets (the ones used on the lander for hanging) legal to be used on the robot? https://www.andymark.com/products/la...upport-bracket

A: Yes, this is a legal COTS part.

---

Ming the Merciless
Game Design Committee Member
Join Date: Sep 2010
Posts: 913

12-09-2018, 04:18 PM #18

Originally posted by FTC6378

**Sticky Material**

Q: Would we be allowed to use a mechanism with a sticky substance (like duct tape) to aid in gathering minerals? The
A: Using a sticky substance in contact with a Scoring Element or Field Element is legal providing there is absolutely no residue. Teams using such a substance may have to demonstrate to the Robot Inspector or Referee that no residue remains on the contacted surface. If this cannot be demonstrated satisfactorily, the team will have to remove the substance/mechanism. Note that Duct Tape is known to leave a sticky residue [https://www.wikihow.com/Remove-Duct-Tape-Residue](https://www.wikihow.com/Remove-Duct-Tape-Residue) so this would not be a legal material to use in this situation.

adhesive does not leave a residue on the minerals or floor tiles, nor would it be strong enough to stick to or entangle another robot.

Thanks for your consideration!

A: Rule <RM02> allows for the use of single speed gearboxes, therefore this gearbox is a legal COTS.

Q: We are removing right angle gear box from this driver and using it on our robot. Is this legal to use?

https://www.dewalt.com/products/acce...hment/dwara100

A: Rule <RM02> allows for the use of single speed gearboxes, therefore this gearbox is a legal COTS.

A: Yes this is a legal COTS part.

Originally posted by FTC12644

**Right Angle Gearbox**

Q: We are removing right angle gear box from this driver and using it on our robot. Is this legal to use?

https://www.dewalt.com/products/acce...hment/dwara100

A: Rule <RM02> allows for the use of single speed gearboxes, therefore this gearbox is a legal COTS.

Originally posted by FTC12595

**Carabiner**

A: is this COTS part, known as King Frog Cable carabiner, legal for FTC.

https://www.kong.it/en/2-products/it...p98-frog-cable

It has a single degree of freedom (two latches rotate on a single pin) and a single purpose, which is closure around a rope or other solid object that is inserted into the latch area.

The closure force is provided by pushing the latches against a solid object. It has no spring or other auto closure mechanism. It
A: Yes, replacing gears is a legal modification.

Dashpot

Q: Is a dashpot a legal mechanism?
A: No, a dashpot, like a shock absorber, works by forcing a fluid (air, oil) through a small orifice. This results in pressurizing the fluid, which is illegal per Rule < RG01.J,K>

Wide Angle Lens

Q: Is it legal to use this lens with the camera on our phone?
A: Yes, providing it is not used to focus the light emitting (flash) from the phone.
[QUOTE=FTC6378;n72534]
**Suction Cups**

Q1: Could a suction cup be used to pick up a mineral? It doesn't seem to be a "closed gas device", unless it becomes one when it is sealed against the mineral.

Q2: In a related question, could we make our own air blower to create a low pressure in a tube to lift minerals? Again, it wouldn't be a closed system, but the pressure differential would be present due to the air being blown out of the tube.

Thanks for your guidance! [/QUOTE]

A1: Yes, providing the suction cup does not damage the Minerals

A2: Yes, providing the exhaust blower air is not constrained in any way that results in an increase in pressure.

---

**1 comment**

**Ming the Merciless** commented
01-09-2019, 05:16 PM

*Originally posted by ecook2017_1*

**Shocks**  
Q: FTC team 13023 would like to use Robot Shocks from Servocity on our 2018 robot.


"Robot Shock will be kept empty with no air compression and shock oil (all oil will be drained (emptied) from the piston). This part will be used only as a spring guide on a free wheel, and not as a shock absorber."

"P.S. We have read the Game Manual and forum posts related to Build Rules."

A: A commercial shock that has been modified to insure that there is no possibility of compressing air or oil, the mechanism is a legal COTS. Be aware that at Robot Inspection your team will most likely have to demonstrate to the Inspector that this device is not a "shock" but simply a guided spring.

---

**Ming the Merciless**  
Game Design Committee Member
01-15-2019, 12:30 PM

*Originally posted by FTC13197*
**Bungee Cords**

Q: Is it legal to use using bungee cords (1 or 2) that stays attached to the robot throughout the game?

https://www.amazon.com/kitchen-toolz-...ds=bungee+cord&psc=1

A: Yes, bungee cords are considered springs, which are allowed in <RM01>.

---

**Ming the Merciless**  
Game Design Committee Member

Join Date: Sep 2010  
Posts: 913

01-17-2019, 09:43 AM  
#24

**4 Axis Phone Mount**

Originally posted by FTC13197

Q: Is 4-axis, 360 degree magnetic phone mount legal? See the attached link for example.

https://www.amazon.com/dp/B00I608BJ8..._t4_B07BZPFZDZ

Thanks.

FTC 13197 - TESLAS

A: No, Rule <RM02> limits COTS parts to one degree of freedom.

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**Ming the Merciless**  
Game Design Committee Member

Join Date: Sep 2010  
Posts: 913

02-11-2019, 09:06 AM  
#25

**Friction Damper**

Originally posted by FTC4537

Q1: This question is coming from me as a hardware inspector. I'd like to get an official ruling.

There are COTS "rotational dampers" (which is an incorrect name since they don't actually dampen motion like a shock absorber) that are nothing but friction a hard-to-turn gear that helps reduce jittery motion. This devices contain no liquids. (There are some that do, and those are clearly illegal.) These devices only have one degree of freedom (rotational) which would seem to make them legal -- similar to a rusty hinge pin. The fact they are 1 degree of freedom, contain no liquids, and are a form of hinge seems to imply they would be legal.

Q2: On a similar note, I saw a team with a spring-loaded gate hinge. My ruling on that is that it is illegal because it is COTS with two degrees of freedom -- one for the plane being hinged and one for the rotational motion of the spring resisting that motion. (Hinges are legal and springs are legal, so a team that builds the spring loaded hinge would be legal.)

Any official confirmation on these?

A1: A friction damper that relies solely on friction, using no hydraulic
dampening is legal.

A2: In the past we have allowed spring loaded linear rods. The spring loaded hinge is the same type of part just in a rotary motion instead of a linear motion. These are legal components.

Originally posted by FTC12080

Worm Gearbox

Q: Are worm gear gearboxes like this one legal?
It's a single speed, back-drivable gearbox.
https://www.igus.com/product/1404

A: Yes, per Rule <RM02> single speed gearboxes are legal.
Raw and Post Processed Materials - Answers

09-19-2018, 02:46 PM

Giorgio Tsoukalos

Senior Member

Join Date: Nov 2013
Posts: 106

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Tags: None

Answers to questions about Raw and Post Processed Materials

---

Ming the Merciless

Game Design Committee Member

Join Date: Sep 2010
Posts: 913

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12-09-2018, 04:18 PM

Originally posted by FTC6378

Sticky Material

Q: Would we be allowed to use a mechanism with a sticky substance (like duct tape) to aid in gathering minerals? The adhesive does not leave a residue on the minerals or floor tiles, nor would it be strong enough to stick to or entangle another robot.

Thanks for your consideration!

A: Using a sticky substance in contact with a Scoring Element or Field Element is legal providing there is absolutely no residue. Teams using such a substance may have to demonstrate to the Robot Inspector or Referee that no residue remains on the contacted surface. If this cannot be demonstrated satisfactorily, the team will have to remove the substance/mechanism. Note that Duct Tape is known to leave a sticky residue [https://www.wikihow.com/Remove-Duct-Tape-Residue](https://www.wikihow.com/Remove-Duct-Tape-Residue) so this would not be a legal material to use in this situation.
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**Giorgio Tsoukalos**
Senior Member

Join Date: Nov 2013
Posts: 106

**Miscellaneous Robot Electrical Parts and Materials - Answers**

09-19-2018, 03:47 PM

Answers to questions about Robot Electrical Parts and Materials that do not fit into another category can be found in this section.

**Tags:** None

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**Buckaroo Banzai**
Game Design Committee Member

Join Date: Sep 2010
Posts: 1010

10-03-2018, 06:29 PM

*Originally posted by FTC8424*

**Subject: Powered USB Hubs within Robot**

Hello, GDC, thank you for a great game this year!

**Question:** We're looking to use an external camera and know that we have to use an unpowered USB hub for connecting it to the Robot Controller and then connecting that hub to the REV Expansion Hub. Is this hub a legal one as long as we don't have an external battery plugged into it at all (e.g., just use it as a unpowered USB hub)?

**TUSITA USB Adaptor**

Thank you!

**FTC8424 Cyber Eagles**

**Answer:** We appreciate the kind words! Yes, the above USB Hub/OTG adapter is legal under current rules. Note that the rules for USB hubs within
the robot were updated in the 1.3 revision of Part 1 of the Game Manual. Take a look at <RE13> and <RE14>.c.iii

Last edited by Buckaroo Banzai; 10-08-2018, 10:08 PM.

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Buckaroo Banzai
Game Design Committee Member

Join Date: Sep 2010
Posts: 1010

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10-03-2018, 06:40 PM

Originally posted by FTC4634

Subject: I2C to SPI Bridge Module

Question: May we use an SC18IS602 I2C to SPI Bridge Module to control addressable LED strips?

It seems to meet all the requirements specified by <RE12-C>:

COTS: yes
Interface module: yes
User-programmable microprocessor: no

Answer: The part number referenced is an IC, not a module. If it is used in a module that does not include the user programming, it would be allowed.

---

Buckaroo Banzai
Game Design Committee Member

Join Date: Sep 2010
Posts: 1010

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10-08-2018, 02:10 PM

Originally posted by FTC4634

Subject: Phone Flash as a Light Source

Question: Does the phone’s camera flash count as a "focused or directed" light source?

Answer: deleted original "Not allowed" answer

Update: While the reflector in the camera flash makes it directed and focused, after discussion with the entire GDC, we have decided to reverse the decision and allow the camera flash to be used to aid vision processing. Good luck with your vision code!

Last edited by Buckaroo Banzai; 10-23-2018, 06:40 PM.
Subject: Quad Alphanumeric Display Backpack

Question: May we use an Adafruit Quad Alphanumeric Display w/I2C Backpack on the robot?

It consists of two parts, a simple LED matrix, and an I2C interface module. This seems to satisfy the requirements of <RE12-C> but we'd just like to confirm that it's allowed.

Answer: Yes. The module described is an example of the types of modules allowed by <RE12-c>.

---

Subject: Powered USB Hubs for UVC Cameras with Modern Robotics Equipment

Question: The recent update to Game Manual Part 1 allows powered USB hubs that connect to a REV Expansion Hub, to better power and support USB webcams.

Are there any comparable legal configurations for using a powered USB hub with the Modern Robotics electronics? If not, is there any supported hardware that allows USB webcams to be powered and used reliably with the Modern Robotics electronics, or must teams use the REV electronics if they wish to use USB webcams?

Answer: Yes. For use in connecting/powering a USB camera, a powered USB hub may be used in a manner parallel to the recommended use for REV Expansion Hubs. Since there is no 5v auxiliary power port available, the only power option will be a USB battery pack.

---

Subject: I2C Controlled LCD module
**Question:** Since alphanumeric displays with I2C interface modules are allowed, would a standard 16x2 LCD with an I2C interface module also be allowed?

**Answer:** <RE12>.c allows light sources controlled by compatible ports of the REV Expansion Hub or Modern Robotics Core Control Modules, this would include I2C ports.

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**Buckaroo Banzai**
Game Design Committee Member

Join Date: Sep 2010
Posts: 1010

**10-16-2018, 06:59 PM**

**Originally posted by FTC10131**

**Subject: Modifying/Replacing the Connectors on the allowed grounding strap**

RE14 l. says "Teams that have electronics with Powerpole-style connectors may also use the REV Robotics Anderson Powerpole to XT30 Adapter (REV-31-1385) in conjunction with the REV Robotics Resistive Grounding Strap." May teams also replace the XT30 adapter on the Grounding Strap with a Powerpole, per RE15? RE15 says in part "Approved electrical and electronic devices may be modified to make them more usable; ... Examples of modifications that are allowed: ...Replacing or adding connectors on wires"?

**Answer:** [deleted original answer]

**Important Update:** The previously given "Yes" answer has been updated to "No". <RE14>.l explicitly disallows use of anything other than the REV grounding strap adapter. By extension, this disallows any modifications to the grounding strap or its adapter.

*Last edited by Buckaroo Banzai; 10-30-2018, 02:34 PM.*

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**Buckaroo Banzai**
Game Design Committee Member

Join Date: Sep 2010
Posts: 1010

**10-16-2018, 07:09 PM**

**Originally posted by FTC8397**

**Subject: LED Control Electronics**

Would the following be an allowed light source?

https://www.ledsupply.com/leds/cree-...high-power-led
Also, our plan would be to power the light source using one of the 5v Aux supplies on the Rev Expansion Hub, and to switch it on and off using one of digital ports, along with either:

a) A transistor,
b) An op amp, or
c) A solid state relay.

Any of these would also require current-limiting resistors.

Would these approaches be allowed?

**Answer:** The LED is an allowed device. The transistor, op amp and relay all fall into the category of “other electronics” and would not be allowed.

---

Originally posted by FTC7253

**Subject: Camera Flash**

Last year, there was a specific forum rules clarification allowing the use of the camera flash:

It would seem that the camera flash is no more of a directed/focused light than any LED (including the color sensor LEDs). Please clarify/reconsider. Why was there a forum post allowing it last year, but one disallowing it this year?

The camera light can significantly improve image processing results, as it helps mitigate the effects of different lighting conditions. This affects the use of the camera for both Vuforia and other image processing (i.e. OpenCV). Under these use cases, the camera light is not being used to hinder other robots - simply to improve image capture consistency - primarily in auton where the bots will not be interacting with each other.

**Velocity Vortex** was a clear example of autonomous issues that can be caused by extremely varying ambient conditions. Please reconsider decisions that could go down the same road again.

**Answer:** In general, forum posting from prior seasons about are not automatically included into current season.

As to the camera flash, every phone flash examined included a one of several variants of parabolic reflectors on the back side of the flash LED, designed to direct and intensify the light output in a primary direction.

While the camera flash based on the above would not be allowed, In discussion with the entire GDC, we reconsidered and came to the conclusion to allow the camera flash to be used to aid vision recognition (a skill we wish to encourage among teams!).
The prior posting will be amended with a note making sure that it is clear that the flash is allowed.

Good luck with your vision code!

---

**Buckaroo Banzai**  
Game Design Committee Member  
Join Date: Sep 2010  
Posts: 1010

10-16-2018, 07:38 PM  
#11

*Originally posted by FTC7253*

**Subject: Camera Flash**

*Last year, there was a specific forum rules clarification allowing the use of the camera flash:*

*It would seem that the camera flash is no more of a directed/focused light than any LED (including the color sensor LEDs). Please clarify/reconsider. Why was there a forum post allowing it last year, but one disallowing it this year? The camera light can significantly improve image processing results, as it helps mitigate the effects of different lighting conditions. This affects the use of the camera for both Vuforia and other image processing (i.e. OpenCV). Under these use cases, the camera light is not being used to hinder other robots - simply to improve image capture consistency - primarily in auton where the bots will not be interacting with each other. Velocity Vortex was a clear example of autonomous issues that can be caused by extremely varying ambient conditions. Please reconsider decisions that could go down the same road again.*

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As to the camera flash, every phone flash examined included a one of several variants of parabolic reflectors on the back side of the flash LED, designed to direct and intensify the light output in a primary direction.

While the camera flash based on the above would not be allowed, in discussion with the entire GDC, we reconsidered and came to the conclusion to allow the camera flash to be used to aid vision recognition (a skill we wish to encourage among teams!).

The prior posting will be amended with a note making sure that it is clear that the flash is allowed.

Good luck with your vision code!

---

**Buckaroo Banzai**  
Game Design Committee Member  
10-16-2018, 07:47 PM  
#12
**Original Poster**: FTC4628  
**Subject**: Electromagnets

Are permanent electromagnets (https://apwelectromagnets.com/permanent-magnets/#filter[attribute][51][120]=120) allowed under <RM01> which specifically lists magnets or disallowed under <RE17> as they are electronics not otherwise listed in the game manual?

**Answer**: While magnets are allowed by <RM01>. Electromagnets (permanent or otherwise) fall into the general "Additional Electronics" covered by <RE17> and are not allowed.

---

**Original Poster**: FTC8397  
**Subject**: Powering LEDs from XT30 splitter

**Question**: If we power an allowed light source and allowed light control module from a Rev Expansion Hub XT30 port, via a Rev XT30 Power Distribution Block, will that comply with <RE12>d.iv.?

**Answer**: Yes

---

**Original Poster**: FTC7330  
**Subject**: Selft-Retracting Power Cables

My students are interested in using a power cable that extends and retracts on a spring to bring power to a motor. For example https://www.amazon.com/gp/product/B0...4Q86RQ8BZE2R4F or https://www.amazon.com/Bayco-SL-800-...extension+cord.

So long as wire gauge requirements are met, would such a mechanism be legal under the 1 degree of freedom COTS rule? There is an in and out motion in addition to the rotation, but we don't see this as being different from tape measures that were ruled legal in previous seasons. Thank you for your consideration.
**Answer:** Yes. Self-retracting cables of appropriate wire gauge are allowed.

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**Buckaroo Banzai**  
Game Design  
Committee Member  

Join Date: Sep 2010  
Posts: 1010

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10-25-2018, 12:07 PM  

**Originally posted by FTC12676**

**Subject: REV Servo Power Module and Mixing Vex 393 motors with other servos**

I understand for Vex 393 motor we will have to use motor controller 29 and Rev Servo power module and there is a limitation of 2 Vex 393 per Servo power module. We are using only one Vex 393 motor so can we still use other port for 2 servos like Hitech or Rev smart servo?

---

**Answer:** Yes. But keep in mind that the Vex 393 motor consumes 1/2 of the power budget for the Servo Power Module. Other servos powered from the Servo Power Module need to be sized appropriately to ensure that the overall power budget for the module is not exceeded.

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**Buckaroo Banzai**  
Game Design  
Committee Member  

Join Date: Sep 2010  
Posts: 1010

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10-30-2018, 08:48 PM  

**Originally posted by FTC2844**

**Subject: Replacing Bottom Plate of REV XT30 Distribution Block**

**Question:** Can we replace the bottom of the REV XT30 PDB with a 3d Printed replacement that includes 2 mounting holes for more secure attachment to the robot? No Electrical Modification has been done, with only the plastic casing being switched. Here is the 3d Printed part in question:

**Originally posted by FTC2844**

https://www.thingiverse.com/thing:3172145

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**Answer:** No.
Subject: Other Light Sources

Question: Since the ruling that disallowed using the phone's camera flash has been reversed (thanks!) would it also be allowed to use a bright 12v LED like this or the Andymark Targeting Light in conjunction with a webcam, since the webcam does not have a built-in flash?

Answer: Both appear to have lenses to focus/concentrate their light sources and are not allowed.

---

Subject: Relay Use Exception?

Question: Most digital servos will continue to hold their position even after the PWM signal from the controller is stopped. One of the great features of the REV Expansion Hub is that once your program stops and the SDK sends the "failsafe" command to the Hub, the Hub will actually turn off the 5v power to the servo ports altogether. Thus, even digital servos will cease operation. This can be a huge safety plus at the end of the match, as a servo-controlled arm on the robot which is caught on something at the end of the match would be de-powered, which would otherwise cause the servo to be stalling, overheating, and possibly become a fire hazard while field personnel perform their post-match duties.

Unfortunately, when using the REV Servo Power Module, this feature is lost. Would the GDC consider making a single-case exception and allow a relay to control the 12v power to the SPM in order to re-create the aforementioned safety functionality?

Answer: No.
Subject: Slip Ring Connectors

Question: Hello! The team is really enjoying the challenge this year! We have seen this answered in a previous year clarification but would like clarification that slip rings are allowed as long as they abide by the wiring gauge requirements. We are actually planning on two slip rings, one slip ring for four servos (4 servos x 3 = 12 wires) and another for the servo power block power (20 amp). Our assumption is that we would not be able to only transmit the PWM signal and that we would need to do all three wires for each servo in this case and is what we have planned for. Thank you!

Answer: Yes. Make sure that everything meets the wire gauge requirements/equivalents and that everything is well insulated.

Original posted by FTC4634

Subject: Powering a USB Hub from the 12V Supply

Question: The current rules state that if a powered USB hub is used, it must be powered from the 5v port on the REV Expansion Hub or a COTS USB battery pack. However, our initial testing has shown that using a standard powered USB Hub dramatically reduces ESD tolerance compared to connecting the phone directly to the REV Hub and frequently causes the REV Hub to pull the FTDI reset line when ESD occurs from contacting the Lander, causing temporary loss of control. Would the GDC be willing to expand the rules to allow USB Hubs to be powered from the main 12v battery, so that Industrial USB Hubs with 15kV ESD tolerance such as this one could be used?

Answer: There are no current plans to approve 12v powered USB hubs.

Original posted by FTC8565

Subject: USB LED Light

Question: During our Vuforia testing, our programmers reported that it was too dark for Vuforia to recognize any of the three minerals during the autonomous period. They then decided to add...
on an LED light to brighten it up in order for Vuforia to work. We were just wondering if this kind of light was legal? (Here's a similar light: https://www.amazon.com/Daffodil-USB-... /dp/B00BWYMPM)

**Answer:** No. Take a look at <RE12>.d for the allowed methods of powering LED lights that are a part of your robot.

---

**Buckaroo Banzai**  
Game Design Committee Member

**Question:**

<RE14>.l says "Electrically grounding the Control System electronics to the frame of the Robot is only permitted using a FIRST-approved, commercially manufactured Resistive Grounding Strap. The only Resistive Grounding Strap approved for use is the REV Robotics Resistive Grounding Strap (REV-31-1269)"

As of this writing, the REV Robotics Resistive Grounding Strap (REV-31-1269) is not available with no indication as to when it will be available. The published specifications of the strap are:

- **Length:** 30 cm
- **Resistance:** 470 Ω 1/2 W 5%
- **Wire Gauge:** 22 AWG
- **Terminations:**
  - XT30 - Male contacts
  - Ring Terminal for #6 or M3 stud

We request a rule change that would allow teams to use a **team manufactured** grounding strap since a commercially manufactured grounding strap is not readily available to all teams. We recently registered to compete in the Rover Ruckus season.

**Answer:** There appears to be stock available as of this reply. The rule stands as written for this season. We will consider updates as we develop the manuals for next season.

---

**Buckaroo Banzai**  
Game Design Committee Member

12-11-2018, 06:56 PM

Originally posted by **FTC9999**

**Subject: Robot Grounding Strap**

**Question:**

<RE14>.l says "Electrically grounding the Control System electronics to the frame of the Robot is only permitted using a FIRST-approved, commercially manufactured Resistive Grounding Strap. The only Resistive Grounding Strap approved for use is the REV Robotics Resistive Grounding Strap (REV-31-1269)"

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  - XT30 - Male contacts
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We request a rule change that would allow teams to use a **team manufactured** grounding strap since a commercially manufactured grounding strap is not readily available to all teams. We recently registered to compete in the Rover Ruckus season.

**Answer:** There appears to be stock available as of this reply. The rule stands as written for this season. We will consider updates as we develop the manuals for next season.

---

**Buckaroo Banzai**  
Game Design Committee Member

12-13-2018, 01:43 AM

Originally posted by **FTC9999**

**Subject: Robot Grounding Strap**

**Question:**

<RE14>.l says "Electrically grounding the Control System electronics to the frame of the Robot is only permitted using a FIRST-approved, commercially manufactured Resistive Grounding Strap. The only Resistive Grounding Strap approved for use is the REV Robotics Resistive Grounding Strap (REV-31-1269)"

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  - XT30 - Male contacts
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We request a rule change that would allow teams to use a **team manufactured** grounding strap since a commercially manufactured grounding strap is not readily available to all teams. We recently registered to compete in the Rover Ruckus season.

**Answer:** There appears to be stock available as of this reply. The rule stands as written for this season. We will consider updates as we develop the manuals for next season.

---
**Originally posted by FTC9999**

**Subject: RE10 REV Servo Power Module and VEX EDR Motors**

**Question:** The game manual says "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 4.8 amps at 7.2 volts (35 Watts). So at 6 volts the stall current would be roughly 4 amps (24 Watts). Moreover, the required VEX Motor Controller 29 draws a maximum 3 amps at 8.5 volts (26 Watts). So at 6 volts the controller can only draw 2.1 amps (13 Watts) from the Servo Power Module (SPM). Thus it appears that the SPM can safely power six VEX EDR 393 servos.

Also, the Modern Robotics Core Servo Controller is rated at 36 Watts maximum power across all output ports. If the Core Servo Controller can safely power two VEX EDR 393 servos, then with an output rating of 90 Watts, and considering the over-current protection feature of the SPM, the SPM can safely power at least four VEX EDR 393 servos.

We request to remove the <RE10> restrictions on the number of VEX EDR 393 servos that may be controlled/powered by the REV Servo Power Module.

---

**Answer:** We are not anticipating changing this rule for the current season. We will re-evaluate as we begin work on next season's rules.

---

**Buckaroo Banzai**  
Game Design Committee Member

**Join Date:** Sep 2010  
**Posts:** 1010

**Originally posted by FTC12833**

**Subject: Electrical Connector**

**Question:** Would these be considered "any compatible connector" per <RE14> part f? [https://www.phoenixcontact.com/onlin...ary=usen&tab=1](https://www.phoenixcontact.com/onlin...ary=usen&tab=1)

**Answer:** Yes, as long as the individual conductors within the connector meet the gauge requirements for the circuits being connected.

---

**Buckaroo Banzai**  
Game Design

**Join Date:** Sep 2010  
**Posts:** 1010

**01-09-2019, 02:05 PM**  
**#25**
Question: Tetrix Robotics sells a Y connector for servos, part 39082, "for connecting two servos to one channel" which we assume is FTC legal. On our robot, we have created our own Y connector with wire and Anderson Powerpoles to drive two motors from one motor port of a Rev Expansion Hub. In application, the motors face each other and thus need to run in opposite directions, which we have taken care by reversing the black and red wires on one of the legs of the Y connector that we made. Is this setup legal?

Answer: There is nothing in the rules that prohibits controlling multiple motors with one motor controller port. Care should be taken to ensure that the operation of the paired motors does not exceed the rated current limit for the motor controller. Additionally, all connections should be appropriately insulated.

Subject: Electromagnets

Q: We were thinking to use parts of a solenoid (coil of wire and rod) to act as an electromagnet. It will not interfere with another team's robot or the playing field. We were going to attach the rod to our team marker and at the start of the match, the coil to be powered to hold our team marker to the robot temporarily, then to drive to the home base in the corner and deactivate the coil which would drop our team marker. After that, the coil would not be used for any other purpose.

https://www.amazon.ca/dp/B018HX0R2W/

We would be removing the spring and E clip and only use the rod and the solenoid coil.

Would this be allowed?

A: No. Electromagnets would fall under <RE17> and are not allowed.
Committee Member

Join Date: Sep 2010
Posts: 1010

Originally posted by FTC1999
Subject: Resistors w/ LEDs

Q: My team would like to use an LED that doesn't contain an internal resistor. In order to use this LED, we need to build a circuit containing the LED and a resistor. We will use a legal power source per rule <RE12>d. IS this allowed or is it an illegal custom circuit?

A: No. This would fall under custom circuits and not be allowed. The allowance for passive electronics (RE11.c) is specific to sensors.

Buckaroo Banzai
Game Design
Committee Member

Join Date: Sep 2010
Posts: 1010

Originally posted by FTC10138
Subject: Spark Mini Motor Controller and LEDs

Just being careful although we believe this is pretty straightforward. The current rule <RE12>d explicitly states that lights can only be powered by: (i.) internal source, (ii.) Power ports on CPDM, (iii.) Motor control ports on CMCM, or (iv.) REV Hub Motor-control ports, spare XT30 ports, 5V aux Power ports, and I2C sensor ports.

Q1. Can one use power from the REV XT30 Power Distribution Block (and if so, can this block be connected directly to the feed from the main power switch or does it have to be cascaded off a hub XT30)?

Q2. Can they be powered by a Spark Mini controller? Control is already allowed via <RE12>b and <RE12>c, but power is the grey area since these motor control ports not directly on the REV Hub?

A1: See Miscellaneous Robot Electrical Parts and Materials #13
A2: Yes. The Spark Mini Controller is essentially and additional motor control port.

Buckaroo Banzai
Game Design
Committee Member

Join Date: Sep 2010
Posts: 1010

Originally posted by FTC13499
Subject: Light Power Sources

01-31-2019, 10:32 AM

02-05-2019, 04:05 PM
Rule <RE12> states Light Sources - Functional and/or decorative light sources (including LEDs) are allowed with the following constraints:

The rule does not allow "focused" lights, but permits "functional" lights.

Sub section d. states

"The only approved power sources for lights are as follows:

i. Internal (as supplied by the Commercial off the Shelf manufacturer) battery pack or battery holder."

I read this as an off the shelf product like a flash light or headlamp is allowed as long as they are not focused. In this respect,

Q1. Can a flash light or some other LED light source independently powered by a battery pack be considered as "functional" light under this?
Q2. If an independent light is not allowed, can I connect an LED strip light to the Rev Power Distribution block to light up the area?

A1: Any light source that includes focusing is not allowed. Most (if not all) flashlights include a parabolic reflector behind the bulb to focus the light. This makes most (if not all) flashlights violate RE12. For other light sources the independent power source (batteries) needs to be manufacturer provided (e.g., a part of the LED system).

A2: Yes. See Miscellaneous Robot Electrical Parts and Materials #13
A: The 12 V motors from Modern Robotics are legal and teams may place any gearboxes they want onto them. The only place where that becomes an issue is that our software comes with pre-configured motor settings that are used by the closed loop control software to do things like run to a fixed position, or to do run at a specific speed. These settings are based on the motor and gearbox (for example, the NeveRest 40 or the NeveRest 60, which are the same base motor, but with different gearboxes). If a team uses a motor with a gearbox that is different from our pre-configured settings, then they might have to do some "tuning" in the software to optimize the motor performance during closed loop control.

The following motors are pre-configured:

- GoBilda 50.9:1 (Planetary)
- GoBilda 53:1 (Spur)
- GoBilda 26.9:1 (Planetary)
- GoBilda 26:1 (Spur)
It is important for teams to know that there are some potential integration issues that should be considered before deciding whether or not to use them on your robot:

- The motors have different electrical 12V power connectors from the kind used with our Control System. Teams might need to purchase or make adapter cables to be able to use these motors with their Control System.
- The encoder cables that are available for these motors have different electrical connectors from the kind used by the REV Expansion Hub. Teams might need to purchase or make adapter cables to use these encoders with a REV Expansion Hub.
- These motors are not currently available as preset configuration options in the FIRST Tech Challenge software. Teams can select a motor from the options menu that has similar characteristics, but teams might also need to do some additional work (i.e., "tune" motor control coefficients) to optimize the motor behavior.

Last edited by Ming the Merciless; 10-07-2018, 01:04 PM.

---

Ming the Merciless
Game Design Committee Member
Join Date: Sep 2010
Posts: 913

10-06-2018, 02:54 PM

Originally posted by FTC3491

**Linear Servos**

Q: In past seasons, the Actuonix Linear Actuators were legal, for example [http://www.andymark.com/product-p/am-3515.htm](http://www.andymark.com/product-p/am-3515.htm)

Can we purchase and use these linear actuators?

A: These are linear servos and are allowed under Rule <RE10>.

---

Ming the Merciless
Game Design Committee Member
Join Date: Sep 2010
Posts: 913

10-07-2018, 01:10 PM

Originally posted by FTC10131

**GoBilda Motor Update**

Q: Post #2 of the Motors and Servos Answers thread states "GoBilda Motors are legal for FIRST Tech Challenge competitions." It then lists 5 motor/gearbox combinations as legal.

There are more than 5 combinations of Modern Robotics motors and goBILDA gearboxes that are currently available for purchase, and it is possible that others may made available in the future.

Should Post #2 be interpreted as saying that any other goBILDA gearbox options are not legal? If so, can you clarify why, given that RM02 explicitly permits the use of arbitrary single speed gearboxes and that FTC teams have used Banebots and Vex.
A: Thank you for pointing out the inconsistency in the original post. That Post has been updated to include as legal all 12V GoBilda motors with any gearbox ratio. The list of "legal" motor/gearbox combinations should have stated that these are the only motors that are pre-configured in the software. That has been corrected.

standalone gearboxes combined with other motors without issue in previous years?

If other goBilda motor/gearbox combinations are not legal, can teams integrate goBilda gearboxes on any arbitrary motor in the same way that they can with Banebots and Vex gearboxes? If not, can you clarify how teams may determine what is a gearbox that is legal to use and what is a gearbox that is not legal to use?

Buckaroo Banzai  
Game Design Committee Member

Join Date: Sep 2010  
Posts: 1010

10-08-2018, 02:12 PM

Answer: No. <RE10> explicitly requires a Vex Motor Controller 29 for each VEX EDR 393 motor

Buckaroo Banzai  
Game Design Committee Member

Join Date: Sep 2010  
Posts: 1010

10-30-2018, 08:43 PM

Answer: <RM04> allows painting of raw materials and COTS parts. While there is nothing in the rules that explicitly disallows painting motors, there are a couple of things to consider:

- the metal housing is part of the heat dissipation mechanism for the motor
- paint flaking off and leaving residue on the playing field (<RG01>.h)
- characteristics and off-gassing of paint when heated (<RG01>.c)
Subject: Servo Voltage Ranges

Question: As per Game manual <RE10> "Servos may be rotary or linear but are limited to 6V or less and must have the three-wire servo connector."

Does that make the use of REV Robotics Smart Servo and Hitec Servo HSR-2645CRH illegal? We started late last year as a rookie team and I saw teams extensive use these two servos. Can some please explain and/or clarify. I have volunteered as a Robot Inspector this year and want to be very well prepared for the role.

http://www.revrobotics.com/rev-41-1097/
https://www.servocity.com/hsr-2645crh-servo

Thanks for all your help.

Answer: Yes. Both are 6v nominal servos. All servos are typically specified with a a range of tolerated supply voltages. Both you included are designed for 6v nominal use.

Subject: Servo Modification

Question: Is the modification of servos to be continuous rotation legal, or does that violate RE12?

Answer: Modification of a servo to convert it into a continuous rotation servo is not allowed per <RE15>.
Subject: Servo power consumption

Question: <RE10> Servos says:

"Teams should be prepared during Robot inspection to show documentation confirming that the servos individually and together on the same servo controller do not exceed the manufacturer specifications for the controller."

Consider the following scenarios:

1. A single VEX EDR 393 motor is connected to the REV Servo Power Module, together with other servos connected to the same module
2. A single VEX EDR 393 motor is connected to the MR Core Servo Controller, together with other servos connected to the same controller

What wattage value do teams document for the VEX EDR 393 in the above scenarios?

Answer: Since the robot construction rules limit use of the VEX EDR motors to no more than two per MR Core Servo Controller or REV Servo Power Module, a reasonable approach would be to derate the current capacity of the modules by 50% for the purposes of determining other servos that can be attached/controlled.

Buckaroo Banzai
Game Design Committee Member

12-27-2018, 12:00 PM

Originally posted by FTC8668

Subject: New Motors?

Question: AndyMark is out of stock of the usual Neverest classics and when they do come back in stock will ship from Sydney Australia. Are the Neverest Sport legal for FTC?

Rev is out of stock of their HD motors with nothing expected within the next month.

That leaves only the goBilda (Matrix) motors. Unfortunately, these motors are not compatible with ANY of our current building systems thus causing ripple effects with the robot construction when you need to replace a motor.

I respectfully request that the Game Committee consider approving other DC motors as FTC appears to be clearing out the market for all legal motors. Having to mix and match non-compatible motors throughout the season is really a problem. Please consider expanding the legal motor list so there are more options and, therefore, more in-stock options that won’t require
Answer: The Neverest Sport is a gearbox, not a motor. We revisit the list of motors allowed annually, but not during mid-season.

---

A: We cannot possibly rule on the legality of every individual servo! A servo is allowed if it is compatible with an allowed servo controller, operates at 6v and has a standard 3-wire connector. Take care to observe total current capacity of the servos and the servo controllers that are used to drive them.

---

A: No. Only the motor listed in part 1 of the game manual are allowed.
[QUOTE=FTC11525;n73070]
Servocity Motor


A: No, this motor is not on the list of approved motors. See Rule RE09
Control System - Answers

**Giorgio Tsoukalos**
Senior Member

Join Date: Nov 2013
Posts: 106

Answers to your questions about the control system.

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**Buckaroo Banzai**
Game Design
Committee Member

Join Date: Sep 2010
Posts: 1010

*Originally posted by FTC4634*

**Subject: REV Expansion Hub Connections**

**Question:** Since USB hubs are allowed between the phone and the control modules for the purpose of adding a webcam, can we connect the secondary Expansion Hub the the USB hub instead of chaining it to the primary Hub over the 485 bus?

**Answer:** Yes. There is nothing in the rules that prohibits using a USB hub to connect to a second Rev Expansion Hub.
Answer: Yes. <RE07> and <RE08> do not place limits on one type of module (REV vs. Modern Robotics) when the other is also used. Be aware that in order to use a Modern Robotics Core Control Module, teams must use a Modern Robotics Core Power Distribution Module as well.

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**Buckaroo Banzai**  
Game Design  
Committee Member

10-24-2018, 01:57 PM

*Originally posted by FTC4634*

**Subject: Replacing the Case of a REV Expansion Hub**

*Would it be allowed to 3D print a custom case for the Lynx PCB inside the Expansion Hub? This seems to be allowed by RE15 as no parts on the PCB would be modified, and simply changing the case should have no effect on safety.*

**Answer:** No. Replacing the case on the REV Expansion Hub is not allowed. Inspectors need to be able to clearly and quickly identify the components used in a robot.

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**Buckaroo Banzai**  
Game Design  
Committee Member

11-07-2018, 06:48 PM

*Originally posted by FTC5110*

**Subject: Are Variants of Allowed Phones also Allowed?**

*Are we permitted to use locally available variants of the Moto G5 phone such as Moto G5s? The G5s is Qualcomm MSM8937 Snapdragon 430 like the G5.*

**Answer:** Only the phones explicitly listed in the Game Manual have been tested and are known to work. Until other phones are tested and explicitly
There is no current plan to allow the replacement of the Modern Robotics CPDM with a COTS USB hub.

A recent rule change allows the RC phone to connect directly to a powered COTS USB hub. Thank you! Essentially, the powered COTS hub serves the primary function of the MR Core Power Distribution Module (CPDM), namely to supply power MR modules and to allow the RC phone to communicate to the same. The CPDM seems to be a superfluous component as a result of the rule change that allows the use of a powered COTS hub.

Moreover, the USB bus on a powered COTS hub is much faster than the USB bus of the CPDM; thus the CPDM slows down communication between the MR modules and the RC phone. The CPDM is also a communications bottleneck further slowing down communication between the RC phone and MR modules. This likely increases MR module response times and sensor latencies. Minimal response times and latencies are vital requirements of robotics.

The CPDM appears to be an expensive component which serves only to add several unnecessary points of failure and to slow down communications between the RC phone and the MR modules. We request a rule change that disallows the use of the CPDM when the phone is connected to a powered COTS USB hub. We also request to allow a powered USB hub to be powered directly via the 12V robot main battery, as are most of the other controllers and components on the robot (including the CPDM). Many COTS USB hubs that are powered via ~12V (i.e. 9+ volts) feature ESD immunity on each port. None of the COTS USB hubs powered via 5V supply seem to have this feature.

---

Using Modern Robotics CDIM with REV Expansion Hubs

Question: My team wants to use both the REV Expansion Hubs and a Core Device Interface Module on our robot, as one of our
sensors requires the DIM. We also are using a USB webcam on our robot, so our robot controller is plugged into a generic powered USB hub, which then connects to the other devices. We've tried plugging in the DIM into this USB hub (alongside the camera and REV hubs), and it does appear to function, without needing a Core Power Distribution Module (as the DIM does not have a +12V PowerPole port).

We cannot plug the USB devices into the hub of the Power Distribution Module because it has a USB 2.0 full-speed hub (12 Mbps max speed) while our camera requires USB 2.0 high-speed (480 Mbps max speed) (confusingly, high-speed is faster than full-speed!) Is this configuration legal?

Alternatively, we could plug the PDM into our USB hub, and then the DIM as the only device connected to the PDM. Would this alternate configuration be legal?

**Answer:** <RE07> requires the use of a Core Power Distribution Module if any Modern Robotics Core Control Module is used within a robot.

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**Buckaroo Banzai**  
Game Design Committee Member

Join Date: Sep 2010  
Posts: 1010

**Originally posted by FTC9794**

**Subject: Soldering to Internal Connections in USB Hub**

**Question:** Is it legal to solder a wire to the 5 volt and the ground on the board of the USB Hub included in the Electronics kit? These two wires would be plugged into the auxiliary 5 volt port on the REV hub in order to make the hub powered so it can be used for Web Cameras.

**Answer:** No. Per <RE15>

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**Buckaroo Banzai**  
Game Design Committee Member

Join Date: Sep 2010  
Posts: 1010

**Originally posted by FTC9999**

**Subject: New Phones**

**Question:** FTC Engineering has confirmed they have tested the Plus variant of Motorola Moto G5 phone and have found no issues other than the minor issue common to Moto G5 and E4 phones.
**Is the Plus variant of the Moto G5 phone legal for competition?**

**Answer:** Work done by FTC engineering to test new/updated models of phones will reflect in future allowed phones list (i.e. next season).

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**Buckaroo Banzai**  
Game Design Committee Member  
Join Date: Sep 2010  
Posts: 1010

01-08-2019, 05:20 PM  

*Originally posted by sramachandran2017*

**Subject: Multiple USB Cameras within a Robot**

**Question:** This is regarding:

RE14 c(iii)(i)

iii. A USB hub that connects to the built-in USB input port of the REV Expansion Hub. If a powered hub is used, it must draw its energy from either

i. **A commercial USB battery pack, or**

ii. A 5V auxiliary power port on a REV Expansion Hub.

We are planning to use 2 USB cameras on the robot in addition to the Phone camera for navigation.

There were doubts about how to wire up the power and what would be legal in the RE14 c(iii)(i) setup.

We are planning to use a "Y" cable to give additional power to the camera and connect to a hub.

Wiring diagram is attached as a picture.

We called Rev Robotics to see how we could connect USB Camera to get power Aux port. They did not have any answers and suggested to get clarity from the forum.

Thank you in advance for the guidance.

11099

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**Answer:** The USB battery may power ONLY the USB hub. The cameras would need to be connected to the hub and draw their power from the hub.

---

**Buckaroo Banzai**  
Game Design Committee Member  
Join Date: Sep 2010  
Posts: 1010

01-24-2019, 12:07 AM  

*Originally posted by jduval2018*
Q: Are Servos that can run at 6.0 volts but may run above that allowed? For instance, the Hitec HSB-9370TH Servo has a voltage range of 6.0V - 7.4V.

A: Yes. almost all servos are specified with a range of operating voltages.

Buckaroo Banzai
Game Design Committee Member

Q: I have been using the Logitech F310 gamepad per the game rules and have determined that these gamepads tend to have very poor linearity. Our pair of controllers joystick jumps from 40% power to 100% nearly instantly. I found an Xbox 360 wired controller (which was very tough to find, 7 local GameStops resulted in 1 controller because they are no longer made) as this is the only other allowed gamepad. The Xbox 360 gamepad had perfect linear response from 0 to 100%, but is almost impossible to find. I see them listed on Amazon, but the product comments have many people stating what they received was a knock off controller. Can the gamepad list get updated for next season to allow for a commonly available gamepad that is a better choice than the Logitech F310?

A: The equipment used for the driver station is assessed annually as part of the update of Part 1 of the Game Manual.
**Giorgio Tsoukalos**  
Senior Member  
Join Date: Nov 2013  
Posts: 106

**Sensors - Answers**  
09-19-2018, 03:48 PM

Answers to questions about Sensors

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**Buckaroo Banzai**  
Game Design Committee Member  
Join Date: Sep 2010  
Posts: 1010

10-03-2018, 06:32 PM

*Originally posted by FTC4634*

**Subject: 3rd Party Quadrature Encoders**

**Question:** May we connect 3rd party quadrature encoders to the encoder ports on the REV Hub / MR Core Motor Controller?

**Answer:** There is nothing in the rules that prohibits the use of 3rd party encoders with any of the motor controller inputs. Be aware that the PID control functionality depends on the characteristics of the encoders. It is possible that detailed configuration may be necessary.

*Last edited by Buckaroo Banzai; 10-08-2018, 10:09 PM.*
10-03-2018, 06:34 PM

Originally posted by FTC4634

Subject: Pixy/Pixy2

Question: Are the Pixy / Pixy2 sensors legal for this season as they were last year?

Answer: Yes. As long as they remain non-user programmable.

Buckaroo Banzai
Game Design Committee Member

Join Date: Sep 2010
Posts: 1010

10-10-2018, 01:47 PM

Originally posted by FTC4634

Subject: Intelligent Sensors & User Programmable Devices re: Pixy/Pixy2

Question: Can the GDC please clarify the ruling that the Pixy/Pix2 are allowed "As long as they remain non-user programmable"?

- <RE11> makes no mention that sensors cannot be user-programmable
- Assuming the above was an accidental omission, that makes the Pixy/Pixy2 totally useless, since they must be programmed through PixyMon in order to be useful.
- If PixyMon is simply counted as an exception to "programming" it, then does that mean that we cannot use the user-created FTC firmware recommended by the manufacturer on the FIRST Robotics support page which enables better compatibility with the MR CDIM / REV Expansion Hub?

Answer:

- <RE17> disallows "other electronics" and provides as a partial list of examples a series of user programmable devices. Intelligent sensors fall into this same category if they include user programming capability.
- PixyMon is a configuration tool, not a programming tool and is allowed to be used to configure the Pixy/Pixy2 modules.
- Loading user-modified or third-party firmware onto any module would be a disallowed modification of the module (<RE15>)
Originally posted by FTC5291

**Subject: Optical Limit Switches as Sensors**

Just Checking if the following sensors is legal, they do not have focused light, they are just IR senders and receivers
Opto Optical Endstop End Stop - They use a TAG to break the light to the receiver

Example Part [https://www.ebay.com/itm/3Pcs-Opto-O...53.m2749.l2649](https://www.ebay.com/itm/3Pcs-Opto-O...53.m2749.l2649)

**Answer:** Yes. These are examples of allowed sensors

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**Buckaroo Banzai**  
Game Design  
Committee Member  
Join Date: Sep 2010  
Posts: 1010

Originally posted by FTC4174

**Subject: Configuration of UVC Camera from Robot Controller**

My team was considering using a USB camera for our robot as allowed in <RE13>; however, the camera we want to use does not initialize in a UVC-compatible mode. It starts up in a USB "boot mode", and you have to load manufacturer-provided firmware, after which it re-enumerates as a USB UVC camera (actually two of them, as the device has two cameras). This firmware cannot be modified or programmed by us, and it acts as a normal camera after the initialization. If we wrote code to perform the initialization from the robot controller, would this camera still be considered legal?

**Answer:** Yes.

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**Buckaroo Banzai**  
Game Design  
Committee Member  
Join Date: Sep 2010  
Posts: 1010

Originally posted by FTC10464

**Subject: USB Sensor**

**Question:** Our team had the idea to use the optical sensor of a mouse as a sensor in our robot in order to track our position. Is plugging a mouse into our USB hub and using the data from it in
**Question:** Is our program legal?

**Answer:** No. `<RE11>` limits sensors to being plugged into either the MR Core Device Interface or the REV Expansion Hub.

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**Buckaroo Banzai**  
Game Design Committee Member  
Join Date: Sep 2010  
Posts: 1010

01-03-2019, 10:36 AM  
#8

*Originally posted by FTC4174*

**Subject: I2C Multiplexers**

In a previous year, a custom PCB for interconnecting multiple I2C sensors with a multiplexer was ruled legal (https://ftcforum.usfirst.org/forum/f...-answer-thread).

Q1) Is this still legal?  
Q2) Would it be legal if we integrated a level shifter onto the circuit board? (rather than requiring an external REV level shifter)  
Q3) Would it be legal if we added transistors that connected to a digital port on the REV Expansion Hub and the VCC of the sensors, to allow us to turn the sensors on and off? All of the power would still originate from the Expansion Hub, we would just have the transistors to interrupt the power to a sensor if we wished to turn it off.

Thanks!

**Answer 1:** Simple I2C Multiplexor are allowed per `<RE11>`.

**Answer 2:** No - `<RE17>`

**Answer 3:** No - `<RE17>`

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**Buckaroo Banzai**  
Game Design Committee Member  
Join Date: Sep 2010  
Posts: 1010

01-17-2019, 12:35 PM  
#9

*Originally posted by FTC4174*

**Subject: Controlling Sensor Power**

My team has multiple Modern Robotics Range Sensors on our robot, and we’re worried about interference between them; so, we would like to be able to turn on and off the sensors in our code, letting us disable sensors we don’t need to use. We’ve checked, and there’s no control over the ranging of the sensors: they start continuously ranging as soon as they receive power, meaning that we cannot stop them apart from turning off the power.

Q1) Is programmatically controlling the +5 volt or +3.3 volt power...
going to a sensor legal, as long as the power originates from the REV Expansion Hub or Core Device Interface Module?

Q2) Would we be permitted to use an I2C I/O expander to do this? (assuming we found one with a current output capability that exceeds the sensor's requirement)

Q3) Would we be permitted to use the REV Expansion Hub or the Core Device Interface Module’s digital output ports to do this? (again assuming that the devices could supply enough current for the sensors)

Thanks!

---

**Answer 1:** If the REV Expansion hub supports enabling/disabling power to the sensors this would be allowed.

**Answer 2:** A simple I2C Mux is allowed per RE11.f ... anything more complex would not be allowed per RE17

**Answer 3:** If the sensor supports an additional control signal that enables/disables the sensor, this would be allowed.

---

**Buckaroo Banzai**

Game Design Committee Member

Join Date: Sep 2010  
Posts: 1010

Today, 12:06 PM  
#10

*Originally posted by FTC9881*

**Subject: Sharp Distance Sensor**

Q: *Is the Sharp GP2Y0D805Z0F Digital Distance Sensor permitted? A detailed description can be found here: https://www.adafruit.com/product/3025*

A: *There is nothing in the rules that prohibits the use of this sensor*
Stuck
Robot Software Rules
09-19-2018, 03:49 PM
Answers to questions about Robot Software Rules
Tags: None

Giorgio Tsoukalos
Senior Member
Join Date: Nov 2013
Posts: 106
Share
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10-09-2018, 09:28 AM
#2

Giorgio Tsoukalos
Senior Member
Join Date: Nov 2013
Posts: 106
Share
Tweet
For the Robot Controller SDK we restrict teams from modifying the .AAR files that are distributed with the SDK. We also prohibit them from streaming non-standard (i.e. data that is not normally streamed by our apps) data. A recent update to this rule in the Game Manual Part 1 covers this in more detail.

The examples listed above (gradle files, Exposed Java files included with the SDK, Manifest files, and layout files) are okay per RS09.

GM1 - RS9 states
Software Modification - Teams are not allowed to modify the FIRST Tech Challenge Driver Station application or Robot Controller SDK in any fashion.

What is considered the boundary of the Robot Controller SDK? I am assuming that the intent of the rule is primarily to protect against decompilation/modification of .aar files, but would like confirmation.

Can the following components be modified:

- gradle files (needed to include other libraries - i.e. opencv)
- Exposed java files in the SDK download (i.e. FtcRobotControllerActivity.java)
- Manifest files
- layout files (note - it is possible to modify the layout directly in the file, or programmatically - are either legal)

Thanks for your time and clarification.

For the Robot Controller SDK we restrict teams from modifying the .AAR files that are distributed with the SDK. We also prohibit them from streaming non-standard (i.e. data that is not normally streamed by our apps) data. A recent update to this rule in the Game Manual Part 1 covers this in more detail.

The examples listed above (gradle files, Exposed Java files included with the SDK, Manifest files, and layout files) are okay per RS09.

Buckaroo Banzai
Game Design Committee Member

11-13-2018, 08:40 PM

Originally posted by FTC12833

Subject: Software During Init

Question: Can TensorFlow and/or Vuforia logic/methods be performed during the Init phase of the autonomous period, or must it wait until after Play begins?

Answer: Yes. There is nothing in the rules that prohibits the initialization of sensors (including cameras and software sensors ... i.e. vision recognition systems) during the robot initialization.
Subject: Vision Code Execution During Initialization

Q: During the initialization of an autonomous OpMode, is mineral detection AND recording the result of the mineral detection allowed? Currently, we only initialize TensorFlow during the initialization period. After hitting play, we begin our first scan for the location of the gold mineral. We devote the first two seconds of autonomous play to recording the result of mineral detection for use in determining drive directions within autonomous drive commands. Being able to scan for the location of the gold mineral during the initialization period is a big advantage. We have seen other teams do the initialization and scan of the sampling minerals during the initialization period. Is it legal to have the initialization AND recording of the mineral detection read within the initialization phase of autonomous?

A: There is nothing in the rules that prohibits the execution of vision processing as a part of the robot initialization. Be aware that the locations of the minerals will likely change as a part of the randomization of the field. Be aware as well that there are anecdotal reports of long-running vision code possibly crashing the robot controller application with uncaught exceptions.

Subject: Kotlin Programming

Q: Is Kotlin legal to use? In game manual 1, rule <RS02> says that Java and Blocks are the recommended languages and that all programming must be done on either 1 of 4 applications (one being Android Studio). We code Kotlin on Android Studio, so Kotlin should be fully legal to use. We need a ruling due to an inspector question at qualifier and would like to have a copy of this official ruling on hand when advancing to future competitions.

A: Yes, but it is not recommended. Teams using Kotlin should be aware that they will not be able to get technical support from event personnel (FTA, CSA, etc). Additionally, use of Kotlin is not supported by FIRST. If there are any issues that arise with the use of the FTC SDK with Kotlin, the team would be on their own for any troubleshooting or technical support.
Stuck Team Marker Rules

10-17-2018, 10:49 AM

Answers to questions about Team Markers

Tags: None

Originally posted by FTC10131

Subject: Team Marker Size

Q1: Rule <TM02> says the minimum size of a Team Marker is 3\" x 3\" by 4\". How is this measured?

Q2: Does it need to completely fill this volume? Or must each dimension just reach that measurement at some point? Examples are a 4\" tall pyramid with a 3\" x 3\" base (is only 3\" x 3\" at the bottom), or a hollow cylinder with diameter 3\" and a height of 4\", or even a large toy "jack: which points 3\" x 3\" by 4\" but takes up very little volume?

Q3: Related question: does the Team Marker size have to stay the same for the entire match, or can a Team Marker expand beyond the maximum size after the start of the match like the Robot can?

A1: Robot Inspectors have several ways to measure this, the easiest will be to push the Team Marker into a corner and use a ruler to measure the
A2: The Team Marker must meet or exceed all three (X, Y, Z) minimum dimensions simultaneously but it does not have to fill the entire volume. For instance, a 4.5” tall flag pole mounted on a thin, 3.1” diameter base would fulfill the requirements. Each of your examples would constitute a legal Team Marker.

A3: Once placed into play on the field, a Team Marker must fall within the allowed minimum and maximum dimensions. It cannot expand beyond the maximum size like a robot. It can, however, be compressed for easier transport but the robot but must expand to a legal size when placed in the Depot (or anywhere else on the field).
Q: Does the Team Marker count as part of the robot when measuring for the 18" by 18" by 18" maximum size? We may have a design that stretches the marker over the edge of the robot. Thank you.

A: Per Rule G4, "Pre-Loaded Scoring Elements may extend Outside the 18-inch (45.7cm) cube volume constraint". The Team Marker is considered to be a Scoring Element, therefore it is allowed to extend beyond the 18" x 18" x 18" starting volume.

Q: Does the Team Marker count as part of the robot when measuring for the 18" by 18" by 18" maximum size? We may have a design that stretches the marker over the edge of the robot. Thank you.

A: Per Rule G4, "Pre-Loaded Scoring Elements may extend Outside the 18-inch (45.7cm) cube volume constraint". The Team Marker is considered to be a Scoring Element, therefore it is allowed to extend beyond the 18" x 18" x 18" starting volume.

Q: We have a question about materials we can use for our team marker. We would like to use either a Gold Mineral or Silver Mineral as a part of our team marker. Is that allowed?

A: There is no rule restricting the use of Minerals as building materials for a Team Marker. However, it must be obvious to the Score Trackers and other Field personnel that these Minerals are part of the Team Marker, and not scored Minerals. If there is any confusion at all, the team will be asked to replace this Team Marker with a more suitable one.

Q: Are teams allowed to use glowsticks and or glow rings on the team marker?

A: No. Glowsticks contain a liquid, that if released, could be a hazard to personnel and the field.
Official Answers to questions about Game Play can be found here.

**Question 1:** Do these Minerals count as Controlling?

**Question 2:** If yes: any guidance on when they are deemed no longer Controlled (e.g. once they stop moving or always considered in control)?

**Answer 1:** The action described violates rule <GS3> because the Robot Controls, via Possession plus Herding, more than two Minerals. Referees may excuse infrequent, unintended removal of a few Minerals from a Crater by a Robot. Removal of excess Minerals during each Robot exit from a...
Crater, or the removal of three or more Minerals above the allowed maximum for a single occurrence of Robot egress will likely be Penalized for violating rule <GS3>.

**Answer 2:** The Herding action ends when the Minerals stop moving.

---

**FTC5291**

**Subject: Incidental Robot contact with the Lander while Latched.**

In the rules regarding Latched, it talks about incidental contact with the Lander. Many Robots are being designed with the Robot weight resting against a Lander side panel. With discussion, there is concern that this is not incidental contact.

**Question 1:** Is a Robot allowed to lean/rest against the vertical outward facing surface of a Lander side panel while the Robot is Completely Supported by the Lander Support Bracket?

**Question 2:** Some designs by the teams use wheels to help guide the Robot up and down the Lander, is this considered incidental contact and thus legal?

**Question 3:** Is a Robot that is Completely Supported by the Lander Support Bracket with virtually no contact with the Lander side panel considered to be legally Latched?

**Answer 1:** Yes
**Answer 2:** Yes
**Answer 3:** Yes

---

**FTC5291**

**Subject: What is the Crater boundary for the purpose of determining Inside?**

**Question:** What defines the vertical plane for Parking In or Completely In the Crater?

**Answer:** The outside edge of the Crater Rim.
**Subject:** <G16> Robots Grasping Game Elements - Robot resting on the Lander.

**Question:** If part of the Robot is resting on a Game Element, such as a part of the Lander that isn't the Lander Support Bracket, but would be removable without use of significant force (i.e., just resting on the top of the Lander), does that violate <G16>?

**Answer:** No

---

**Subject:** <GS10> Robot Scoring while in Crater and <GS11> Obstructing Travel Between Lander and Crater

**Question:** Can a Robot extend into the Landing Zone from the Crater, to be protected under the scoring clause of GS6, as it has broken the vertical boundary of the Lander Zone, while having the infinite number of minerals due to the ruling in GS3?

**Answer:** The action describes violates rule <GS11>. If the Robot attempts to Score, it violates rule <GS10>.

---

**Subject:** <GS3> Control/Possession Limits of Minerals

**Question 1:** Given there are relaxed limits to Controlling Minerals in the Crater, would it be allowed to Control the majority of the Minerals indefinitely?

**Question 2:** If not, could you give guidance on what the limit is (quantity restriction? Time restriction?)

**Answer 1:** No. Per rule <GS3>, Herding or directing multiple Minerals beyond the allotted maximum to gain a strategic advantage (i.e., Scoring, accessibility, defense) is not allowed.

**Answer 2:** Referees will issue a warning to the Drive Team after it is clear that they are no longer attempting to stop Controlling/Possessing excess Minerals. Following the warning, the Drive Team has 5 seconds to comply with rule <GS3> constraints before Penalties are assessed.
Subject: Questions about Latched, Landing, and Deployed

Game Manual Part 2 definition of latched and section 1.5.1.1 include the following: A Robot is considered Latched when it is Completely Supported by the Lander Support Bracket on the Lander and is not in contact with any other Game Element, Robot, or the Playing Field Floor. Incidental contact with Scoring Elements, the Lander sides or legs is allowed.

Question 1: Can a definition of incidental, as it relates to this scenario, be provided?

Question 2: What criteria will the Referees use to evaluate a legal latch release/landing?

Question 3: Will it be legal if: A robot is attached to the lander support bracket such that all of the vertical component of force resulting from weight of the robot is supported by the bracket, but the robot hangs at a non-vertical angle, thereby applying a horizontal force against the lander side.

Answer 1: A definition of incidental in this context is contact with the Lander that is accompanying but not a major part of being Latched. For example, a) a Robot resting against the Lander’s outward vertical side panel is allowed; b) Robot weight supported by the top of the Lander is not allowed.

Answer 2: The criteria for Landing is clearly described in section 1.5.2 of the Game Manual Part 2.

Answer 3: Yes

Subject: Controlling Minerals while the Robot is In a Crater

Question 1: Can a robot intentionally cause minerals to roll towards the depot from inside the crater, as long as it is not in contact with more than 2 minerals that have cleared the crater boundary?

Question 2: Can a robot launch minerals into the lander if it has components in both the crater and the lander area simultaneously.

Question 3: Does control of a mineral end when there is no longer contact with the robot?

Question 4: Can a robot impel minerals towards the crater boundary with the intent of removing the minerals from the crater?
Answer 1: No, per rule <GS10>.
Answer 2: No, per rule <GS10>.
Answer 3: No
Answer 4: No

**Question 1:** drive between the crater and the lander, does a robot have to move to get out of its way since there is no room for the large robot?

**Answer 1:** No. The intent of rule <GS11> is to allow unobstructed travel by Robots sized no larger than an 18 inch cube.

**Question 2:** If there is room for an 18"x18"x18" robot to go past the lander while you are in the area between the lander and the crater, but they want to go exactly where you are, are you obstructing another robot's path of travel?

**Answer 2:** No

**Answer 3:** Obstructing in the context of rule <GS11> is a Robot preventing an open path of travel for another Robot in the Area between the Lander and Crater. The open path does not have to be the Robot's preferred path through this protected Area. Blocking is defined in section 1.4 of the Game Manual Part 2.

---

**Buzz**  
Game Design Committee Member

Join Date: Sep 2010  
Posts: 629

**Question:** Is sliding the Minerals out of an intake by either reversing the intake, dumping via gravity, using a servo to push from the intake into the depot or lander considered placing?

**Answer:** Yes

---

**Buzz**  
Game Design Committee Member

Join Date: Sep 2010  
Posts: 629

**Subject:** Placing Minerals in the Depot or Lander

**Question:** Is sliding the Minerals out of an intake by either reversing the intake, dumping via gravity, using a servo to push from the intake into the depot or lander considered placing?

**Answer:** Yes

---

**Buzz**  
Game Design Committee Member

Join Date: Sep 2010  
Posts: 629

**Subject:** <GS5> Blocking Access to both of an Alliance’s sides of the Lander and <GS6> Interfering with Scoring at the Lander

If a robot parks under the lander in the last seconds of the End Game, it may be able to prevent both opposing robots from accessing their lander brackets and thus latching. The rules appear to say that this action would result in a 40 point Major Penalty. But as this action would prevent 100 points scored by the opposing robots, it would appear that this strategy could be numerically worthwhile.
**Question:** Are there other penalties that should be called in such a scenario that would cost the offender more than the 100 points gained and thus make this action numerically not worthwhile?

**Answer:** The action described in the scenario should be Penalized for violating both <GS5> and <GS6> for each opposing Alliance Robot that attempts to access the Lander to Score. The Penalty for obstructing two opposing Alliance Robots in this manner is 160 points plus additional Minor Penalties every five seconds as described in the two rules. Repeated violations of this type are likely to be considered intentional rule violations and additionally Penalized as egregious behavior.

---

**Question:** Are there other penalties that should be called in such a scenario that would cost the offender more than the 100 points gained and thus make this action numerically not worthwhile?

**Answer:** The action described in the scenario should be Penalized for violating both <GS5> and <GS6> for each opposing Alliance Robot that attempts to access the Lander to Score. The Penalty for obstructing two opposing Alliance Robots in this manner is 160 points plus additional Minor Penalties every five seconds as described in the two rules. Repeated violations of this type are likely to be considered intentional rule violations and additionally Penalized as egregious behavior.

---

**Question:** We have found that the lander has a lot of side to side movement. If a robot is running into the lander and causing it to sway back and forth, will this be considered interference with latching and/or scoring minerals?

**Answer:** Robot interaction with the Lander while it is attempting to Score is likely to cause some Lander motion. This motion is expected and teams should design and operate their Robot accordingly. A Robot that is "running into the Lander" without an intent to Score while an opposing Alliance Robot is attempting to Score a Lander achievement will probably be viewed by Referees as a violation of rule <GS6>.

---

**Question:** Is sucking in a third mineral on purpose and using said mineral to eject another mineral legal?

**Answer:** The Robot's actions described in the scenario do not violate the rule.
Mineral Control/ Possession rule <GS3>, provided that the Minerals remain in the Crater during this action.

---

**Buzz**
Game Design Committee Member

**Join Date:** Sep 2010  
**Posts:** 629

**Question:** Can a Robot incur a major penalty for driving into its own depot, carrying two minerals, but accidentally pushing a mineral that was already in the depot, thus controlling 3 scoring items.

**Answer:** The Robot in this scenario does not violate rule <GS3>. This ruling does not apply to a Robot in the opposing Alliance's Depot.

---

**Buzz**
Game Design Committee Member

**Join Date:** Sep 2010  
**Posts:** 629

**Question:** Our team marker fell off of our robot during the driver-control period. Is this a violation of rule <GS9> for "launching" a game element?

**Answer:** A <GS9> Penalty should not be assessed for a Team Marker that falls off of a Robot.

---

**Buzz**
Game Design Committee Member

**Join Date:** Sep 2010  
**Posts:** 629

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Originally posted by FTC12993

**Subject:** <GS3> Control/ Possession Limits of Minerals - Minerals in a Depot

**Question:** Can a Robot incur a major penalty for driving into its own depot, carrying two minerals, but accidentally pushing a mineral that was already in the depot, thus controlling 3 scoring items.

**Answer:** The Robot in this scenario does not violate rule <GS3>. This ruling does not apply to a Robot in the opposing Alliance's Depot.

---

Originally posted by JIRodriguez72

**Subject:** <GS9> Launching Game Elements - Team Marker falling off a Robot

**Question:** Our team marker fell off of our robot during the driver-control period. Is this a violation of rule <GS9> for "launching" a game element?

**Answer:** A <GS9> Penalty should not be assessed for a Team Marker that falls off of a Robot.
**Original posted by FTC5291**

**Subject: <GS5> Blocking Access to Scoring in the Lander - Opposing Alliance Robot is not attempting to Score in the Lander**

**Question 1:** If the opposing alliance is not in their landing zone, but scoring in the depot, is it legal to drive under the lander to get to the opposing alliances crater?

**Question 2:** Would this be considered blocking access to the Lander even when no robot is trying to get access?

**Answer 1:** Yes, an opposing Alliance Robot must demonstrate intent to Score in a Lander or Latch for rule <GS5> to come into play.

**Answer 2:** No

---

**Buzz**

Game Design Committee Member

Join Date: Sep 2010

Posts: 629

**Originally posted by FTC1000**

**Subject: <GS3> Control/Possession Limits of Minerals - Accidental Possession of a Mineral**

**Question 1:** If a robot on the opposing alliance is trying to score a mineral, and it falls into our robot by mistake, is my robot “in possession” of the element?

**Question 2:** Will it count against us if we are also moving elements?

**Answer 1:** Yes

**Answer 2:** Yes, the Mineral that is accidentally Possessed by the Robot counts towards the two Mineral Control/Possession constraint described in rule <GS3>.

---

**Buzz**

Game Design Committee Member

Join Date: Sep 2010

Posts: 629

**Originally posted by FTC11115**

**Subject: <T5> Wireless Communication at Tournaments**

**Question:** Rule <T5> states that "No other wireless communication is allowed". It is our understanding that this implies communication between the drivers and the robot... however, would it be legal to allow one robot to communicate with it's partner with, for example, optical communication (LED’s or lights + optical...
**Answer:** No, however, the GDC will consider the requested rule change for a future season.

_Last edited by Buzz; 12-17-2018, 03:35 PM. Reason: Corrected a text format issue._

---

**Buzz**  
Game Design Committee Member  
Join Date: Sep 2010  
Posts: 629  

12-17-2018, 03:34 PM  

*Originally posted by FTC9794*  

**Subject:** Alliance Partner communication after the Match has started.

**Question:** After the match has begun, can teams move around their respective alliance station in order to talk with their alliance partner? Can they go behind the referee scoring station in order to communicate better?

**Answer:** The Drive Team Coaches may move around Inside their Alliance Station in order to talk with their Alliance Partner, provided that it does not interfere with the Scoring Referee, and Field Personnel are not occupying the area behind the Scoring Referee. The Head Referee, FTA, FTAA, etc. may occupy this area while observing Match play or when assisting Drive Teams.

---

**Buzz**  
Game Design Committee Member  
Join Date: Sep 2010  
Posts: 629  

01-07-2019, 01:58 PM  

*Originally posted by FTC5202*  

**Subject:** <G16> Robots Grasping Game Elements - Crater Rim

We were wondering what the definition of "grabbing" game elements is in regards to the crater rim. More specifically, what constitutes grabbing the crater rim?

_In <G16> of Game Manual 2, it says,_

"Robots may not grab, grasp, and/or attach to any Game Element, Robot, or structure other than Scoring Elements, unless specifically allowed by game-specific rule(s) listed in Section 1.6.3."

However, grabbing is not defined in 1.4 Game Definitions.

Our design uses the crater rim as a temporary anchor to hold a collector on the end of an arm while our robot drives backwards to extend and lock the arm in place. This design would apply minimal pressure to the inside of the crater rim for a short duration (_less..._)
than 5 sec), less than the pressure a drive train would apply when exiting the crater.

We would not have anything that specifically grabs the crater, we would only use the back surface of our collector.

**Question:** Would our design be considered illegal? And if so, why?

**Answer:** A Robot applying pressure against only one side of the Crater Rim does not violate rule <G16>.

**Last edited by Buzz; 01-07-2019, 02:04 PM.**

---

**Buzz**  
Game Design Committee Member

Join Date: Sep 2010  
Posts: 629

**Subject:** <GS9> Launching Game Elements - Game Elements Inside a Robot

<GS9> states that we can only launch game elements in the Landing zone if we are launching in an attempt to score. The game manual part 2 also states that launching is defined as "propelling game elements into the air".

**Question:** Is it legal then to use a spinning flywheel as a transport system that moves the mineral between point A and point B within the robot only in the horizontal direction? It does not directly score the elements, but rather is just used for speedy transport.

**Answer:** Rule <GS9> does not apply to Game Elements while they are inside the Robot body.

---

**Buzz**  
Game Design Committee Member

Join Date: Sep 2010  
Posts: 629

**Subject:** Keeping track of Drive Team/Robot strategies across multiple Matches and Playing Fields

If we can use the example scenario of question 21 in the autonomous answer section.

Suppose the team in question slams their arm down in the crater in every match, (this was a design choice.) Given the high density of minerals in the crater, the ejection probability is high. It is viewed as a strategy and thus should be penalized (major) under GS2.
when the opponents sampling field is disturbed.

In the real world, robots play different opponents, on opposite sides of the field, opposite fields, with different drivers and refs are highly unlikely to see the same team or remember these types of inadvertent "strategies" that are consequential from match to match.

**Question 1:** What is the proper mechanism to deal with this type of repeated "inadvertent strategy"?

**Question 2:** Is it the responsibility of individual teams to keep track of this?

**Answer 1:** Rule <T3> in the Game Manual Part 1 describes how Teams may discuss Match play with the Head Referee.

**Answer 2:** The tracking of repeated violations is traditionally done by the Head Referee. In a single Playing Field event, this activity is trivial. In a two Playing Field event, the tracking depends on the number of Head Referees. Usually, there is one Head Referee that moves between the two Playing Fields. In this case, the tracking is again trivial. If there are multiple Head Referees, then there needs to be good communication between the Head Referees about tracked issues.
Stuck

Scoring - Answers
09-19-2018, 02:56 PM

Official Answers to questions about Scoring can be found here.

Tags: None

#1

Buzz
Game Design Committee Member
09-19-2018, 02:56 PM

According to <G14>, the rule first states that scores will be certified at the end of the match as quickly as possible, but then states that scoring elements will not be recounted at the end of the match. This could allow for there to be a mistake in score tracking.

**Question 1:** What is included in certifying the score?
**Question 2:** What is the reasoning behind not recounting scoring elements?

**Answer 1:** After the conclusion of the Match, the Head Referee or a designated Referee will consult with the scoring Referees to ensure the status of the Playing Field has been recorded correctly, and that all Penalties have been recorded properly.

**Answer 2:** This is the Game Rules thread of the Rover Ruckus Q&A Forum and this is not a game play question.
Pre-Match - Answers

09-19-2018, 02:54 PM

Official Answers to questions about what happens Pre-Match can be found here.

Pre-Match - Answers

10-16-2018, 04:30 PM

Official Answers to questions about what happens Pre-Match can be found here.
**Answer 1:** To safely move the Robot from the queue to the Playing Field, the Robot main power (12VDC) must remain OFF until the Robot is placed Completely Inside the Playing Field. The Driver Station and Robot Controller Android devices should be powered on before the Robot arrives at the Playing Field.

**Answer 2:** This action is allowed if the Robot main power (12VDC) remains OFF until the Robot is placed Completely Inside the Playing Field. Of course, the benefit of running a program on the Robot Controller is limited with the Robot main power (12VDC) turned OFF.

---

**Question 1:** Initializing the robot off, but next to, the field before placing the robot on the field.

**Question 2:** Running a program on the robot off, but next to, the field prior to placing the robot on the field.

**Answer:** Yes, provided that the Robot is completely In the Playing Field and the action doesn’t unnecessarily delay the beginning of a Match.

**Question:** Is it allowed to align the robot with the Playing Field Wall during Pre-Match Setup in order to calibrate sensors (such as a gyroscope)?

**Answer:** Yes, provided that the Robot is completely In the Playing Field and the action doesn’t unnecessarily delay the beginning of a Match.

**Question 1:** Do robots need to be motionless prior to the start of the match?

**Question 2:** For example, would a continuously sweeping servo while waiting for the start of the match be allowed? (Assuming that the robot stays within the size constraints, of course.)
Answer 1: Yes
Answer 2: No

---

**Buzz**
Game Design Committee Member
Join Date: Sep 2010
Posts: 629

10-23-2018, 02:52 PM

Originally posted by FTC5501
Subject: <G3> Pre-Match Robot Placement and <G5> RobotSetup/Alignment - Robot lifting itself during Pre-Match setup

**Question:** During pre-match setup, are we allowed to sit our robot on the floor in our alliance's Landing Zone with the lifting device extended, initialize our program, which in turn would latch on to the lander and pull it up into the starting position? We would wait until the robot is completely in the field before turning it on and the process would not delay the start of the match. After initialization the robot would be latched and within the 18" sizing constraint. Thanks!

**Answer:** Yes, provided that the Drive Team using this method:

a) Makes an effort to be the first one on the Playing Field;
b) Notifies field personnel and the other Drive Teams about what they are doing; and

c) Has a Drive Team member as a safety lookout/guard as the Robot's init routine executes.

---

**Buzz**
Game Design Committee Member
Join Date: Sep 2010
Posts: 629

11-05-2018, 04:25 PM

Originally posted by FTC13259
Subject: Pre-Match Robot Set-up - Contact with an opposing Alliance Robot

**Question:** At the start of the match, may robots that are hanging-touch the opposing alliances robot underneath the Lander. I.e. it's quite possible that hanging robots will cross over the red blue dividing line. Assuming that there is no entanglement issues-- is this a valid starting situation.

**Answer:** A Robot may not contact another Robot before the start of the Match.

---

**Buzz**

11-05-2018, 05:14 PM

**Answer:** A Robot may not contact another Robot before the start of the Match.
Originally posted by FTC12971

Subject: Pre-Match Robot Set-up - Latched Robot "drifts down" before the start of the Match

Question: If a robot starts "drifting down" after a Referee notifies the Drive Teams that Robots are in a "hands-off" state, the Robot may play the Match, however it is not eligible to earn the Autonomous Landing Score.

Rule <G4> is violated if the Robot is not able to remain within the 18-inch cube Robot starting volume constraint during the time before a Referee notifies the Drive Teams that Robots are in a "hands-off" state.

Answer: If the Robot starts "drifting down" after a Referee notifies the Drive Teams that Robots are in a "hands-off" state, the Robot may play the Match, however it is not eligible to earn the Autonomous Landing Score.

Rule <G4> is violated if the Robot is not able to remain within the 18-inch cube Robot starting volume constraint during the time before a Referee notifies the Drive Teams that Robots are in a "hands-off" state.

Originally posted by FTC9819

Subject: Robot and Drive Team starting locations

Question 1: May Drive Teams select their robot's field starting position or is the starting location mandated by the match schedule?

Question 2: May Drive Teams select where they stand in the Alliance Station?

Thank you for clarifying!!!

Answer 1: Drive Teams may select either of their Alliance specific starting locations for their Robots. Alliance Drive Teams should agree to their respective Robot starting locations before they approach the competition Playing Field to set up for a Match.

Answer 2: No, rule <G3> states that "Drive Teams must stand Completely inside the Alliance Station at the location (Station one or Station two) specified by the Qualification Match schedule." Station one is the location closest to the audience. Drive Teams standing in the correct location help the Emcee, Game Announcer, and other field personnel perform their tasks.
Subject: Pre-Match Robot setup - Confirming that a Robot is legally Latched to the Lander

We noticed many matches this weekend where pre-match, robots were latched to the Lander and within an 18” cube for size, but because the Lander walls bent in and the robot leaned, the robot was not 4” off the ground at the start of Autonomous. In most cases, robots that Landed from this position were still given credit for the Landing achievement.

Question: Will refs do anything to measure the pre-match starting configuration of robots to see if Latched robots are starting 4” off the ground (like slide a 4” tall board under the robots)? How will refs ensure that the 4” rule is being met? Or will robots that are visibly at least a few inches off the ground pre-match and Land from that position be given credit for the Landing achievement?

Answer: Referees are expected to verify that Robots are legally setup to start a Match. This includes determining that a Robot satisfies one of the pre-match starting options described in Section 1.5.1 of the Game Manual Part 2. Robots that are less than 4-inches above the Playing Field Floor when a Match starts are not eligible to earn the Autonomous Landing Score.

Referees may use a custom measuring tool, tape measure, etc. to verify compliance with the 4-inch Robot elevation requirement.

Originaly posted by FTC9849
Subject: Pre-Match Robot Setup - Latched Robot Encroaching Into the opposing Alliance’s Landing Zone

Question: Our robot design has a lift mechanism and latch that places about half of our robot under the lander when we start autonomous. Part of our robot will go over the line separating the landing zones. According to Game Manual Part 2, section 1.5.1, if you start the match deployed, you must be outside of the opposing Alliance’s Landing Zone. There is no similar restriction when you are latched. Would a robot design that encroaches on the opposing Alliance’s Landing Zone while latched be legal and not breaking any game rules. Thanks for your help and all you do!

Answer: Thank you for alerting the GDC to this discrepancy. Robots that are Latched to the Lander must start Outside the opposing Alliance’s Landing Zone.

Originaly posted by FTC10131
Pre-Match - Answers - FTC Forum

Subject: Pre-Match Robot Setup - Motionless Robot with power applied to a DC Motor

Question 1: Are robots allowed to provide power to a DC Motor and leave the motor in an unmoving, stalled state pre-match?

Answer 1: Yes, provided that the Robot is motionless and no other rules are violated.

Question 2: Some landing/latching mechanism designs may not hold their position unless some power is applied to a DC Motor. We note that LinearOpModes can power motors before a match starts, and we wonder if there are any concerns regarding battery, motor, and heat-dissipation safety/health with leaving a motor powered and unmoving for an extended period of time prior to the start of a match.

Answer 2: In general, stalling a DC Motor should be avoided due to the issues raised in the question.

Pre-Match - Answers - FTC Forum

Subject: Drive Team Location in the Alliance Station for the Elimination Matches

In the Pre-Match Answers Thread, Post #8, (https://ftcforum.usfirst.org/forum/t...8286#post68286), there was the following Q and A:

Question 2: May Drive Teams select where they stand in the Alliance Station?

Answer 2: No, rule <G3> states that “Drive Teams must stand Completely inside the Alliance Station at the location (Station one or Station two) specified by the Qualification Match schedule.” Station one is the location closest to the audience. Drive Teams standing in the correct location help the Emcee, Game Announcer, and other field personnel perform their tasks.

As noted in the answer, the Alliance Station is specified by the Qualification Match Schedule.

Question 1: For Elimination Round matches, may teams select their preferred Alliance Station as these are not specified by the Qualification Match schedule?

Question 2: If teams may stand where they wish for the elimination round matches, would you reconsider the ruling in post #8 and allow teams to also stand where they wish for qualification matches as well? We respectfully submit that it does not present an undue burden for Emcees, Game Announcers, and other field personnel to have teams select their preferred driver station locations, as Emcees, Game Announcers, and other field personnel have historically performed their duties admirably in...
previous FTC games regardless of the driver station locations chosen by teams. [We know, this request is a long shot, but we thought we’d try anyway. 😊]

Thank you for your consideration.

**Answer 1:** For Elimination Matches, Alliance Partner Teams may jointly decide where each Drive Team stands in their Alliance Station (Station 1 or Station 2).

**Answer 2:** No, the requirement for where a Drive Team stands in the Alliance Station for Qualification Matches has been in the Game Manual for many seasons. There are no unique conditions in Rover Ruckus that justify changing this requirement.
Official Answers to questions about the Autonomous Period can be found here.

**Question:** If a Team Marker uses stored mechanical power to propel itself from the Lander area into the Depot, would this count as being placed into the depot and receive 15 points?

**Answer:** No
In the 1.5.2 Autonomous Period section of Game Manual Part 1 states that "The Team Marker may only be delivered by placing it into the Depot. Launching, shooting, throwing, etc. of a Team Marker is not allowed".

**Question 1:** Is rolling the Team Marker across the field and into a Depot an allowed Scoring method?  
**Question 2:** What does "placing" as mentioned the 1.5.2 Autonomous Period section require?

**Answer 1:** No  
**Answer 2:** The Team Marker should be deployed without a noticeable horizontal release motion. Small, inconsequential horizontal motion of a deployed Team Marker is allowed.

---

**Buzz**  
Game Design Committee Member  
Join Date: Sep 2010  
Posts: 629

10-15-2018, 03:44 PM  
Originally posted by FTC10673

**Subject: Delivering a Team Marker**

The rule states that The Team Marker may only be delivered by placing it into the Depot. Launching, shooting, throwing, etc. of a Team Marker is not allowed.

**Question 1:** May a team drop their team marker into their depot using gravity?  
**Question 2:** May a team use gravity to roll their marker into their depot?  
**Question 3:** Must part of the robot be in the depot to place the team marker?

**Answer 1:** Yes  
**Answer 2:** No  
**Answer 3:** No

---

**Buzz**  
Game Design Committee Member  
Join Date: Sep 2010  
Posts: 629

10-15-2018, 05:10 PM  
Originally posted by FTC14019

**Subject: Rolling a Team Marker into the Depot**

Earlier, team 1104 asked, "Is rolling the Team Marker across the field and into a Depot an allowed Scoring method?" The response was No.

**Question:** Does a team marker with rollers on the bottom of it and being pushed across the field by a robot count as "rolling" as long as the team marker is secure on the robot?
**Answer:** The action described is allowed if the Team Marker is In the Depot when it disengages from the Robot.

---

**Buzz**  
Game Design Committee Member  
Join Date: Sep 2010  
Posts: 629

10-15-2018, 06:09 PM  
#6

*Originally posted by FTC13513*

**Subject:** Parking in a Crater

**Question 1:** Are robots allowed to park in either crater in the autonomous period?  
**Question 2:** By parking quickly in a crater, is it possible to occupy another team’s anticipated parking spot?

**Answer 1:** Yes  
**Answer 2:** Yes

---

**Buzz**  
Game Design Committee Member  
Join Date: Sep 2010  
Posts: 629

10-15-2018, 06:12 PM  
#7

*Originally posted by FTC13513*

**Subject:** Robot moving the Gold in both of the Sample Fields for their Alliance

**Question:** May a single robot knock off both of their alliance’s gold minerals in autonomous?

**Answer:** Yes

---

**Buzz**  
Game Design Committee Member  
Join Date: Sep 2010  
Posts: 629

10-15-2018, 06:24 PM  
#8
**Originally posted by FTC5291**

**Subject: Sliding the Team Marker out of the Robot**

**Question:** Is sliding the team marker from the robot allowed, ie, we planned on using a servo to push the team marker off the robot into the depot. This would have been the same way teams used a conveyor belt to place glyphs into the Cryptobox, they were pushed off the end of the robot.

**Answer:** Yes, provided that the Team Marker is In the Depot when it is released from the Robot.

---

**Originally posted by FTC5501**

**Subject: <GS2> Autonomous Period Robot Interference - Sample Field**

**Question:** During the autonomous period, if we are attempting to park our robot in the crater closest to the opposing alliance’s side of the field and we knock off their silver mineral, how will that be handled? According to GS2 we would not be assessed a penalty because we are in the process of scoring in a crater and are exempt from this rule.

**Answer:** This action violates rule <GS2> for Interfering with the opposing Alliance's Sample Field. The exemption for Robots that are attempting to Score in a Crater does not apply.

**Note from the GDC:** Rule <GS2> begins with: "Robots may not Interfere with the opposing Alliance's Scoring attempts or Sample Field during the Autonomous Period." Later in the rule the GDC emphasizes that the intent of this rule is to "allow Robots to Score their Autonomous Points without defensive play by the opposing Alliance." When the GDC wrote the rule, we recognized that without further clarification for the part of the rule that states: "Interfering with the opposing Alliance's Scoring attempts [is not allowed]," some Autonomous Scoring achievements would be unplayable and/or difficult for a Referee to apply rule <GS2> to the correct Robot. For example, Robots on opposing Alliances are likely to interact while attempting to Park In the same Alliance neutral Crater. To avoid rule <GS2> Penalties for this situation, the GDC added the statement: "Robots attempting to Score in a Crater are exempt from this rule." The GDC's intent to allow Robots to Score in a Crater without violating rule <GS2> is explained further in the rule's Orange Box.

A Robot driving through an opposing Alliance’s Sample Field and dislodging a Silver Mineral is clearly not currently attempting to Score in a Crater; it is violating the upfront statement in rule <GS2> that Interfering with the opposing Alliance's Sample Field is not allowed. Applying a rule <GS2>
violation consequence at the point in time that the Silver Mineral is dislodged is not influenced by the Robot at a later time attempting to Score in a Crater. In this post's scenario, the exemption to rule <GS2> for Robots that are attempting to Score in a Crater does not apply until after the Silver Mineral is moved by the defensive Robot and it is clear to a Referee that the Robot is attempting to Score in a Crater.

The Robot's actions described in the scenario above, clearly violates rule <GS2> because the Robot Interferes with the opposing Alliance's Sample Field (i.e., a defensive action) when the Silver Mineral is moved from its starting location.

Last edited by Buzz; 11-13-2018, 09:22 PM. Reason: Added the postscript note from the GDC.

Answer: Yes, this satisfies the intent of the Game Design Committee.
**Answer:** Yes

*Last edited by Buzz; 11-06-2018, 07:47 PM.*

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**11-09-2018, 02:52 PM**

*Originally posted by FTC10131*

**Subject:** Sample Field Scoring and rule <GS2> Autonomous Period Robot Interference: Sample Field

**Question 1:** Does the Autonomous Sample Field achievement get scored at the instant it occurs or at the End of the Autonomous Period?

**Question 2:** If a robot removes the Gold mineral from a Sample Field but then later that robot or their partner removes a Silver mineral from the same field, do they get points for the achievement?

**Question 3:** A red alliance robot removes the Gold mineral from their Sample Field. A blue alliance robot moves a Silver mineral which then rolls to the red side and dislodges a Silver mineral from the same red Sample Field. Does the red alliance get autonomous points for the Sample Field achievement that now has both 1 Gold and 1 Silver no longer in their starting positions? Does the blue alliance get a penalty for this?

**Question 4:** A red alliance robot does NOT attempt to remove the Gold mineral from their Sample Field. A blue alliance robot moves a Silver mineral which then rolls to the red side and dislodges a Silver mineral from the same red Sample Field. Does the blue alliance get a penalty for this?

---

**Answer 1:** The Autonomous Period Sample Field achievement Score is finalized based on the locations of the Sample Field Minerals at the end of the Autonomous Period.

**Answer 2:** No

**Answer 3:** A Sample Field at the end of the Autonomous Period that has one or two Silver Minerals removed from their respective taped Areas has zero Score value, regardless of how the Silver Minerals are removed from their taped Areas.

If the Blue Alliance Robot moves a Silver Mineral off of its mark in their Alliance's Sample Field and it meanders around, bouncing off other objects (Playing Field Walls, Minerals, Lander Legs, Crater Rims, etc.) before hitting and moving an opposing Alliance Silver Mineral, Referees will likely view this action as being Inadvertent and not Penalized for violating rule <GS2>. If instead, the Silver Mineral follows a direct path to dislodging the opposing Alliance's Silver Mineral, the Referees may or may not view the action as violating rule <GS2>. This decision will be determined by how the Referees regard the action. A <GS2> Penalty will be assessed if the Referee views the action as a planned strategy. No <GS2> Penalty will be assessed if the
Referee views the action as Inadvertent.

**Answer 4:** Rule <GS2> has a provision for Referees to not award a Penalty per rule <G30> if the actions are Inadvertent and Inconsequential. Referees are likely to view the random travel of the Silver Mineral to be Inadvertent and the action is Inconsequential because the Gold Mineral was not removed from the Sample Field by a Red Alliance Robot. If the Referee views the Blue Alliance Robot's actions as not being a planned strategy to interfere with the opposing Alliance's Sample Field, a <GS2> Penalty should not be assessed.


---

**Answer 1:** Yes
**Answer 2:** Yes

---

**Answer:** A Team Marker is counted as Scored the moment that it is stationary in a Depot and it is not in contact with the delivering Robot.
**Subject: How will Drive Teams know that a Depot is Completely Claimed?**

**Question:** How do drive teams determine if each depot is fully claimed or not at the end of autonomous?

Knowing whether your depot is claimed or not can affect your decision to defend the depot or do other activities. Knowing whether your opponent's depot is claimed or not can affect your decision to try to descore their minerals or do other activities.

**Answer:** The Scoring Referee for an Alliance will signal a Completely Claimed Depot for this Alliance by saying the phrase "Red/Blue Depot Completely Claimed." Drive Teams that care about the status of either of the Depots are responsible for listening for the declaration. No guarantees of volume of statement, clarity of phrasing, or ability to repeat. No replays will be granted based on "We didn't hear it" types of claims.

---

**Subject: <G21> Scoring Elements in Contact with Robots - Sample Field Gold Mineral Possessed by a Robot**

**Question:** Does rule <G21> come into play or do we get the sampling points if we remove the gold mineral by sweeping it into our robot?

**Answer:** Rule <G21> does not apply to this scenario. Robots may earn the Sampling Score while it Possesses the removed Gold Mineral.

---

**Subject: Robot entering an opposing Alliance Landing Zone during the Autonomous Period**

**Question:** When a robot lands during autonomous is it allowed to get in to the opposing alliances landing zone?
**Answer:** Yes, provided that the Robot does not illegally interfere with an opposing Alliance Robot. For example, a rule <GS2> violation is possible.

---

**FTC12823**

Originally posted by FTC12823

Subject: <S1> Unsafe Robot and Playing Field Damage - Robot impact with a Playing Field Wall

**Question:** Is a robot hitting the wall in the autonomous period considered field damage? Thanks!

**Answer:** No, provided that the Robot does not cause a physical change to the Playing Field Wall that affects game play, or would require the wall segment to be repaired or replaced.

---

**FTC9794**

Originally posted by FTC9794

Subject: Drive Team using the Driver Station to stop an unsafe Robot during the Autonomous Period.

**Question 1:** If a team presses the stop button during the autonomous period due to safety reasons, should they receive a yellow card if it is the team's first time performing this action and the damage was inadvertent?

**Question 2:** Should the robot be disabled for the driver-controlled period as well if the unsafe behavior was only due the fact that the robot was not being controlled by drivers during the autonomous period?

**Answer 1:** Rule <G9> allows a Drive Team to stop their Robot for safety reasons without incurring a Penalty. When possible, consult with a Field Technical Advisor or Referee before stopping a Robot for safety reasons during the Autonomous Period. Referees could issue a Yellow Card if the Robot damages the Playing Field.

**Answer 2:** In this scenario, the Robot may participate in the Driver-
Controlled Period if the Robot operates safely and does not cause damage to the Playing Field or another Robot.

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**Subject: Placing a Team Marker in a Depot**

- **Question 1:** Is it fair to state based on the manual and forum rulings to date that the point is that the robot "brings" the marker to the depot before disengaging, that is, for the robot to have to travel in contact with the marker to the depot until the marker is released from contact with the robot, once the marker breaks the plane of the depot?

- **Question 2:** If the robot drops its marker during its earlier autonomous activity (ie the robot and marker disengage from one another), but the marker falls in such a way that the marker is subsequently pushed (ie they re-engage) by the same robot into the depot in a way that the robot is in contact with the marker when the marker breaks the plane of the depot, is that a legal placement of the marker?

- **Question 3:** Similar to (2) above, but if the first robot drops its marker and does NOT re-engage and push its marker into the depot, but then the first robot's alliance partner (second robot) happens to push the first robot's marker into the depot, is that a legal placement of the first team's marker?

**Answer 1:** Yes

**Answer 2:** Yes, provided that the Team Marker is not Launched.

**Answer 3:** Yes, provided that the Team Marker is not Launched.

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**Subject: <GS2> Autonomous Period Robot Interference - Sample Field Interference by Minerals removed from a Crater**

- **Question:** A robot moves to park in the opposing side crater in autonomous by driving to the crater and extending an intake into the crater, thus being "In" the crater. When their intake is extended, multiple minerals are knocked out of the crater and into their opponents Sample Field silver minerals, dislodging one or both of them. Does this inadvertent but consequential action merit a Major Penalty or not?
Answer: A <GS2> rule violation will be determined by how the Referees regard the action. A <GS2> Penalty will be assessed if the Referee views the action as a planned strategy. No <GS2> Penalty will be assessed if the Referee views the action as Inadvertent. For example, if a Robot causes Minerals to eject from the Crater in this manner every Match, it is likely to be viewed as a strategy and therefore a violation of rule <GS2>.

[FYI, an example of this scenario happening can be seen in this video with the red 8401 robot extended into the blue-side crater at 1 hour, 38 minutes and 40 seconds into the video: https://www.youtube.com/watch?v=K0KLZJ2f6sc&t=1h38m40s]
Official Answers to questions about the Driver Controlled Period can be found here.

**Question 1:** Is it considered as obstructing another robot’s path of travel even if no other robot is trying to get to that area?

**Question 2:** In other words, can a robot stay in that area more than 5 seconds at a time, and perhaps for the entire match, as long as no other robot is trying to get through?

**Answer 1:** No

**Answer 2:** Yes
Originally posted by FTC10131

Subject: <GS7> Latching before the End Game

**Question 1:** If during the driver-controlled period, a team supports some or all of their weight on the Lander Support Bracket but then later moves so no weight is supported by the Lander Support Bracket and no contact is being made with the Bracket, is the team eligible to Latch on during End Game and receive the 50 Latching points, or does GS7 apply preventing the team from scoring the 50 points? Examples here might be a robot that didn't fully deploy during autonomous but deploys in the first 10 seconds of the driver-controlled period, or a robot that, while scoring minerals in the Lander during the driver-controlled period, accidentally connects to the Lander Support Bracket for a few seconds but then releases fully and moves away from the lander.

**Question 2:** During autonomous, a robot lands but is unable to fully separate from the Lander Support Bracket. All of the weight of the robot is supported by the playing field floor but the robot remains in contact with the Bracket for all of the driver-controlled period. Is the robot eligible for the End Game 50 Latching points if during the End Game the robot re-supports all of its weight back onto the Lander Support Bracket and is fully supported by the Bracket at the end of the match?

**Answer 1:** A Robot that doesn't fully Deploy from the Lander during the Autonomous Period may separate from the Lander during the Driver-Controlled Period to become eligible to earn the End Game Latching Score.

A Deployed Robot is not allowed to intentionally Support any portion of their weight with the Lander Support Bracket prior to the start of the End Game per rule <GS7>. Contacting the Lander Support Bracket while Scoring Minerals is allowed. If the Robot's Latching mechanism attaches to the Lander Support Bracket while the Robot is Scoring Minerals, the Referees will likely consider this to be a violation of rule <GS7>.

**Answer 2:** In this scenario, if the Lander Support Bracket supports any portion of the Robot's weight it violates rule <GS7>. For example, a Robot resting on the Playing Field Floor and tethered to the Lander Support Bracket using a hook and string is partially supported by the Lander Support Bracket.

First, thank you for your answer to our previous question on GS7. Follow up questions:
**Question 1:** GS7 says "Deployed Robots are not allowed to intentionally Support any portion of their weight with the Lander Support Bracket prior to the start of the End Game. Robots that attempt to Latch to the Lander Support Bracket before the start of the End Game are not eligible to Score the End Game Latching achievement." Can you clarify what "intentionally" means in this rule, or give an example of where intentionally comes into play? For example, if a team lands during autonomous but is not able to separate from the Lander due to a malfunction in their bracket connection or robot, does this count as intentionally supporting their weight prior to End Game in GS7? Is a robot in this scenario able to simply re-Latch and score 50 points in End Game or not?

**Question 2:** If a team lands during autonomous but is not able to separate from the Lander due to a malfunction, but their connection does NOT place any weight on the bracket (e.g., a hook on an arm that is completely supported by the robot and arm), are they eligible for the Latching achievement in the End Game?

**Question 3:** Must a robot completely separate from the Lander Bracket at some point during the match in order to be eligible for the Latching achievement in End Game? [We ask because the Game Manual appears to say that a robot must be Deployed, and Deployed is defined as "Not Latched," and Latched is defined as "Fully Supported by the Lander Bracket," so from these definitions, it would seem as though a robot could be Deployed if it is not fully supported by the Lander Bracket even if it is still attached to the Bracket in some way as long as it is no longer Fully Supported by the Bracket.]

**Answer 1:** In the context of this rule, "intentional" is a "deliberate" action (i.e., "done on purpose"). The Robot in this scenario violates rule <GS7> and is therefore not eligible to earn the End Game Latching Score.

**Answer 2:** Technically, the Robot described in this scenario is not violating rule <GS7>. However, Robot actions need to be clear/obvious to a Referee standing outside the Playing Field Wall. It is possible that a Referee viewing this Robot interacting with the Lander Support Bracket will consider this a violation of rule <GS7>.

**Answer 3:** Yes, because of rule <GS7>. Deployed Robots are not allowed to intentionally Support any portion of their weight with the Lander Support Bracket prior to the start of the End Game.
scoring them] while their intake held two minerals they had just acquired. The robot was attempting to leave the depot when this happened, and the contact with the additional minerals was incidental to their acquisition and de-scoring of the 2 possessed minerals. Should this be considered a penalty?

Answer: The Robot's actions described in this scenario do not violate rule <GS3>. The Referee watching the Robot's actions may have viewed the action differently and correctly called a Penalty for violating rule <GS3>.

Originally posted by FTC13259

Subject: <GS3> Control/Possession Limits of Minerals - Blocking access to Minerals in a Crater

Is it a legal defensive strategy to park a robot in the crater-thereby potentially preventing access to minerals-either actively or passively. This would be a robot that rarely leaves the crater. This is a robot that can easily climb in the crater and would block teams from picking up Minerals. They essentially would used their robot to prevent other teams from reaching in and grabbing Minerals. This assumes that an opposing team is trying to retrieve minerals and is denied some access to the crater by the parked robot. is this legal? gs3?

Answer: The scenario described In the point violates rule <GS3> depending on the amount of access denied to the opposing Alliance Robot(s). Referees watching the Match will make this determination.

Last edited by Buzz; 01-07-2019, 02:01 PM.

Originally posted by FTC10138

Subject: <GS3> Control/Possession Limits of Minerals - Minerals along the outside of the Crater Rim

A discussion among drivers on our team brought up an interesting series of questions regarding herding and plowing. Of specific concern though is the following:

During play, it's common for occasional minerals to be knocked out of the crater to remain along the outside edge. These are not being strategically controlled and are in fact a nuisance as the robot using an extending "arm" to reach into the crater to pick up minerals is being blocked from approaching as closely as they may like. Once the robot has their two minerals, they retreat from the crater, deposit said minerals into the lander and return to the crater.
edge. In doing so they re-establish contact with those loose minerals along the outside crater rim. For sake of discussion, assume they are blocks and they push up to, but do not break the plane of the outer rim (if they break the plane, they are then "in" the crater and the strict limit of 2 is different).

**Question:** Would this contact be ruled plowing (thus no <GS3> penalty) or herding (and thus penalized)? The reason for concern is once the robot picks up their two minerals inside the crater, those being bumped into on the outside of the crater rim will exceed two if it's ruled a controlling position. There is no strategic advantage to the contact but it would be great to get an official ruling.

**Answer:** The action described is Plowing and it does not violate rule <GS3>.
End Game - Answers
09-19-2018, 02:55 PM

Official Answers to questions about the End Game can be found here.

Tags: None

Stuck

Buzz
Game Design Committee Member
10-04-2018, 11:19 AM

Originally posted by FTC5290
Subject: End Game Robot elevation off of the Playing Field Floor while Latched.

Question: Is there a minimum distance the robot must be off the playing field floor at the end of the Match to achieve the 50pt score? In the starting position, it clearly indicates a minimum of 4" but there is not such specific value for End Game.

Answer: No. Keep in mind that the determination of Latched is decided by Earthlings observing the Robot from outside the Playing Field Wall at the end of the Match (i.e., Match Time = 0 ). Teams are encouraged to make the height above the Playing Field Floor obvious and unambiguous.

Buzz
10-15-2018, 05:54 PM

#3
Game Manual Part 2 section 1.5.4 states in part, "Points are awarded at the End of the Match for the following End Game achievements..." and "End of the Match" is defined as "The moment when a Match timer reaches 0:00."

**Question:** To clarify, does this mean that a robot does not need to stay Latched and come to rest Latched after the end of the match when motors have been disabled to earn End Game Latching points, but merely needs to be Latched at the moment the match timer reaches 0:00?

**Answer:** Yes

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This came up during a scrimmage we recently hosted. Our head referee and referee staff has asked us to post this question for clarification.

**Situation:** During endgame a blue alliance robot was attempting to latch onto the blue side of the lander that faces towards the audience. Part of the blue robot (the front right wheel) was sticking under the Lander and crossing the mid line of the field into the red Landing Zone. A red robot was also attempting to latch in the red audience facing side of the lander. However, contact with the blue alliance robot that was pulling itself up prevented the red alliance robot from successfully latching.

Here are the questions:

**Question 1:** Would this be a <GS6> Blocking Access to Scoring in the Lander violation on the blue robot, even though the blocking was inadvertent and occurred as part of their own attempts at Latching?

**Question 2:** Does it matter whether the blue robot is extending into the Red Landing Zone under the Lander body enough for a <GS6> infraction to be called if it results in blocking a successful Latch by the opposing alliance?

**Question 3:** In this case, there was another red Lander side available for latching (facing away from the audience). The red robot could have Latched unimpeded on the other Lander face despite the encroachment of the blue robot into the Red Landing
Answer 1: The Robot's actions violate rule <GS6>. It is also a possible rule <GS5> violation depending on the circumstances.

Answer 2: In general, a Latched Robot that does not extend into the opposing Alliance's Landing zone should not be awarded <GS5> and/or <GS6> Penalties. However, a Referee may declare a <GS5> and/or <GS6> violation if the Robot's design or strategy appears to be intended to interfere with or Block an opposing Alliance Robot from Latching onto its Alliance's Lander Support Bracket.

Answer 3: No

Answer 4: No

Question 4: Is it a penalty to cross into the opposing alliances Landing Zone during end game if the opposing alliance isn't attempting to score/ latch?

Thank you for your help in determining the correct action here.

Answer: Rule <G24> applies to a Robot that is Latched to the Lander. In a given Match, a Robot may only earn points for accomplishing one of the three End Game tasks (i.e., Robot Latched, Robot Parked In any Crater, and Robot Parked Completely In any Crater).
Committee Member

Join Date: Sep 2010  
Posts: 629

 Originally posted by FTC12666

Subject: Is a Robot that starts the Match Deployed eligible to earn the End Game Latched Score?

Question 1: We’re trying to get clarification on section 1.5.4 (End Game) of the game manual part 2. Is it required that the robot start in the latched position during autonomous (1.5.1, subsection 1) to earn the 50 points if they end latched on the lander (1.5.4, subsection 1)?

Question 2: Instead, can the robot be deployed from lander (1.5.1, 2) and still earn the 50 points if they end latched on the lander (1.5.4, subsection 1)?

Answer 1: No

Answer 2: Yes

Buzz  
Game Design  
Committee Member

Join Date: Sep 2010  
Posts: 629

12-11-2018, 06:16 PM  
#7
The GDC agrees that the Team's suggested accommodation has merit. After discussion, the GDC decided not to change the rules to allow the requested exception. Robots may not Latch to the opposing Alliance's Lander Support Bracket.

Originally posted by FTC8424

Subject: Disabled Robot(s) Blocking Access to the Opposing Alliance’s Cargo Hold and/or Latch

We had a strange situation happen in the league meet this weekend. A blue robot flipped over onto its back right in red alliance's landing zone. The other blue robot then came and tried to flip them back up onto their drive train, became entangled, pushed the other robot in front of the other red landing zone and subsequently flipped over. Now, both blue robots are blocking BOTH red alliance landing zones, and associated lander brackets for latching. Neither red team was able to latch due to this, and neither blue robot got penalized because they were disabled. Blue lost that match, by about 20 points.

In FIRST RES-Q, if similar things happened the opposing alliance would be allowed to climb the mountain of the different color so they could still get the end-game points. We realize that the games are different, but the situations are pretty much the same this year with this game.

Question: Should an exception be made in this instance to allow the "blocked" alliance to latch and lift on the opposing alliance’s lander brackets if theirs are being blocked by disabled (and un-penalizable) robots?

Thank you!

Answer: The GDC agrees that the Team’s suggested accommodation has merit. After discussion, the GDC decided not to change the rules to allow the requested exception. Robots may not Latch to the opposing Alliance’s Lander Support Bracket.
greater than the point value of a Major Penalty. For this reason, the GDC is changing the requirements for a Latched Robot to the following:

**Latched** - A Robot is considered Latched when it is Completely Supported by the Lander Support Bracket on the Lander and is not in contact with any other Game Element, **corresponding Alliance (i.e., same Alliance) Robot**, or the Playing Field Floor. Incidental contact with Scoring Elements, the Lander sides or legs is allowed (for example, Possession of Scoring Elements is allowed). Latching is evaluated and Scored by earthlings. Teams are encouraged to make these actions obvious and unambiguous.

The intent of this change is to allow a Robot to remain eligible to earn the End Game Latched Score when it is contacting an opposing Alliance Robot.

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**FTC10131**

**Subject: End Game Latching with completely separated or loose Robot Parts**

**Question 1:** If a part falls off the main robot chassis (e.g., an arm, or a large or small piece of metal, or a screw/nut) and the robot Latches in the End Game with the exception that the separated piece remains laying on and supported by the playing field, does that robot get credit for the 50 point Latching achievement?

**Question 2:** If a robot part becomes loose on a robot and remains connected to a robot only by a semi-flexible component (e.g., a servo-based mechanism falls off but the robot drags the mechanism around by the servo wire, or a chain becomes loose and the chain drags around on the playing field surface) and the robot Latches in the End Game with the exception that the loose, dragging component remains laying on and supported by the playing field, does the robot get credit for the 50 point Latching achievement?

**Answer 1:** Yes, inadvertently separated Robot parts that are no longer contacting the Robot do not invalidate a Latched achievement.

**Answer 2:** No

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**FTC10298**

**Subject: Scoring a Latched Robot at the End of the Match**

Thank you for answering our previous question concerning the above topic. Your answer seems clear to us. However, at a recent meet, there were a few unexpected rulings.
**Question 1:** At the time = 0:00 mark, if the robot is latched but is drifting downward but has clearly not touched the mat or anything else does the hang count?

**Question 2:** Please confirm that the position of the robot relative to the mat is only relevant for scoring at the time = 0:00 mark and not when the buzzer stops sounding.

**Answer 1:** Yes

**Answer 2:** Yes, keep in mind that per the definition of Latched in section 1.4 of the Game Manual Part 2, "Latching is evaluated and Scored by Earthlings. Teams are encouraged to make these actions obvious and unambiguous."

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**Originally posted by FTC9794**

**Subject: <S1> Unsafe Robot and Playing Field Damage - Lifting up the Lander**

**Question:** Is slightly pushing the lander up less than an inch while attempting to latch on the lander considered field damage if none of the playing field tiles split apart and the lander is not pushed out of the field floor?

**Answer:** Briefly lifting the Lander a small amount as described in the scenario does not violate rule <S1>.
Find answers to questions about Tournament Rules here.

**Tournament Rules - Answers**

09-19-2018, 03:03 PM

Find answers to questions about Tournament Rules here.

**Stuck**

Tournament Rules - Answers - FTC Forum

1 of 6 4/3/2019, 1:36 PM

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**Giorgio Tsoukalos**

Senior Member

Join Date: Nov 2013

Posts: 106

**Subject: Rule <T14> Clarification**

**Q:** Teams will receive a minimum of five minutes (5:00) between consecutive matches.

When does the time for the 5 minutes begin and end? Does it start once the buzzer hits 0 on the match you are playing on when you remove the robot? Does it end when you are asked to place you robot on the field?

**A:** The 5 minute minimum is built into the schedule and referred to as cycle time. The 5 minutes begins when a match has ended, and ends at the start of the next match. The 5 minutes does include robot setup on the field, as well as robot placement prior to the start of the next match.
A: Drive teams may not delay setting up their robots for a match once they have been directed to move from the on-deck queue to a competition playing field. At this time, drive teams are expected to completely prepare their robots to start a match following the guidelines described in the Game Manual Parts 1 and 2.

Field personnel will make every effort to minimize the length of time robots are set up on the playing field waiting for the match to start. Keep in mind that unexpected delays may occur after drive teams have been called to a playing field due to action on another playing field, playing field repair, robot setup problems, etc. Teams should factor this into their robot design, battery capacity/charge state, etc., the potential for match start delays after robot placement.

Giorgio Tsoukalos
Senior Member

Q: In finals matches, there are often times when teams must place their robot on the field, and there is a long gap between when the ftas have the teams initialize. Would it be legal for a team to place their robot on the field in the landing zone, exit the field until the fta allows the team to initialize, and then re enter the field, latch the robot and then hit init?

A: This is considered a safety hazard to the driver, other teams competing on the field, as well as a safety/trip hazard for the field personnel and is not allowed.

Q: Our drive coach is quite short (~4’9”). This makes it difficult for her to see the field and impossible for her to see over our driver and operator (who aren't even that tall, they’re both ~5’7”).

In order to help her see and level the playing field (so to speak), we got her a short (~12”) step stool. As we see it, this doesn't provide any sort of competitive advantage because she remains relatively short (~5’9”), certainly shorter than many other drivers at the competition. In fact, we see it as an accessibility device: a simple, non-obtrusive way to enable everyone to participate in FIRST without providing a competitive advantage to anyone.

Is our drive coach allowed to have her stool in the Alliance Station during matches, provided that it doesn't interfere with tournament operations?
A: Only students that are in middle school or high school (grades 7-12) are eligible to participate in FIRST Tech Challenge.

A: Working against your own alliance partner to obtain a competitive advantage is against the spirit of Gracious Professionalism. Not only does it put their alliance partner at a disadvantage, but it diminishes the experience of the team who is purposely losing for the purposes of letting another team be successful and advance to the next level of competition.

It is the intent of FIRST Tech Challenge and the Game Design Committee to encourage Gracious Professionalism at every event. Remember that the same team you compete against in one match may be your alliance partner in another match. Verified actions such as stated above may result in the application of rule <T1>, Egregious Behavior.
Teams are allowed to take their own notes during a match to help them keep track of their own scoring achievements throughout the competition. They can bring their own notes to with them to the question match, however it is up to the Head Referee and the Scoring Referee(s) to discuss and ultimately determine if anything was missed during a match. Questions about a qualification match score must be brought to the question box within the allotted times outlined in the Game Manual Part 1, rule <T3>.

We realized a few matches after that our score should have been higher than posted on the same match, however it was past the three matches to dispute and we couldn't show proof that our score should have been higher. What evidence can a team provide refs for a scoring issue? Would notes that other students take be worthy?

Thanks!

A: Teams are allowed to take their own notes during a match to help them keep track of their own scoring achievements throughout the competition. They can bring their own notes to with them to the question match, however it is up to the Head Referee and the Scoring Referee(s) to discuss and ultimately determine if anything was missed during a match. Questions about a qualification match score must be brought to the question box within the allotted times outlined in the Game Manual Part 1, rule <T3>.

Originally posted by FTC13499

Subject: Switching Alliance Stations

Q: When we are paired with an alliance, we are assigned a side of the field, such as RED 1 or RED 2. Can we talk to our alliance partner and switch sides of the field if necessary? So for example, if we were originally assigned to BLUE 2, but we want the side of the field with the crater in it, can we switch to BLUE 1?

Any help is appreciated.

Thanks.

A: Teams are required to stand in the alliance station as designated by the match schedule, which is generated by the scoring system. The scoring system uses an algorithm that not only randomizes your alliance partners and red or blue, it also is designed to randomize which teams stand in which alliance station (as in, station 1 or station 2). The scoring system will, as equally as possible, ensure that each team is stationed in both station 1 and station 2, regardless of which alliance a team is assigned.

Originally posted by FTC10298

Multiple Team Markers
Q: Is it legal for a team to have two separate team markers? Only one team marker would be used at a time. However, they would need to be different depending on what autonomous program is run. Both legal team markers would be brought to queuing and then depending on what auto is run the appropriate one would be pre-loaded into the robot and brought to the field per usual.

A: There is no rule against bringing multiple Team Markers to an event. However, both must be inspected and only one may be used at a time.

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Giorgio Tsoukalos
Senior Member

Join Date: Nov 2013
Posts: 106

02-07-2019, 10:13 AM

Originally posted by FTC6041
Subject: Competing with Two Robots

Q: In Game Manual 1, rule T7 c says a second robot cannot be used at concurrent tournaments, however we’ve seen teams discussing online using second robots at their next level events and at world’s. Is this the correct reading of that rule, that teams cannot build a second robot that improves on the one they use at earlier competition events? That is my team’s understanding.

A: Your interpretation of the rule is correct. Teams should use one robot during the season and make changes to the robot during the season as needed/appropriate.

EDIT 2-13-2019
We would like to apologize for the previous response to the proposed question. Although the rule can be interpreted as not using a second robot whatsoever, FIRST has reviewed the ruling and would like to revise the answer previously posted. This edit serves as the official answer, and the previous response will remain as a reference.

Rule <T7> was created to ensure that teams entered a single robot into a tournament and to compete with that robot throughout the entire tournament. Teams cannot use a second robot at a tournament, nor can they use two different robots at concurrent tournaments. However, if a team were to build a secondary robot that was to be used at a different competition on a different date, this would be considered a legal and allowed strategy.

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jweiland2017

02-07-2019, 12:54 PM

Originally posted by jweiland2017
Subject: Alliance Station Positions During Elimination
**Matches**

**Q:** Does the scoring software assign positions to teams for the elimination rounds too? The 01-31-2019 post explains what happens in the qualifying rounds.

**A:** No. See Pre-Match #12 for the information that has been posted for teams on what is allowed during elimination matches.
Field Setup - Answers

Find answers to questions about Field Setup here.

Tags: None
Subject: Placement of Side Panels - Lander Build Procedure

Q: I would like to clarify a lander build procedure. Some of the CAD pictures in the 2018-2019 Field Assembly Guide (rev 1.3) are confusing. Specifically the diagrams in Steps 1-6 & 1-8 for the shorter Gold Mineral cargo area, the polycarbonate siding looks like it is to be placed on the outside of the metal corner brackets.

This is counter to the wording of Step 1-8, “The panels should sit on the inside of the brackets”.

I have seen landers built both ways. Could we get a ruling on which way it is supposed to be.

A: The polycarbonate sides of the lander should always be assembled with the corner bracket on the outside. In step 1-6 the polycarbonate is placed on the gold, or short side panel. The step outlines "The Side Panels should sit between the flange and the Corner Bracket". Step 1-8 outlines that the polycarbonate should be places on the inside of the bracket, not the outside.
A: There's no formal rule on how to distribute the minerals, just that they be as evenly distributed as possible between each crater after each match. Part of the challenge is that robots must sort through the craters, be mindful of which they pick up, and place them in the appropriate cargo hold in the lander. Since the craters are also alliance neutral, it is okay if the minerals are not distributed as an exact equal split, as robots can pick up minerals in both craters.

Silver game elements into each Crater. The Gold and Silver should be approximately equally distributed around the entire inside area of the Crater."

The picture shows the silver and gold equally distributed every other one, I know that isn't realistic or the intent of the guide, but it would be helpful if you could give some guidance on a good way to randomize the crater elements. I have watched some league meet videos that no one resets the elements between matches other than the ref would take the few elements that made it into the lander and toss them into each of the craters. (That doesn't seem very random, plus there were clumps of cubes everywhere as well as clumps of balls)

At our meets, I had a reseter that would take the elements that were in the lander and depot and disperse them between each match by taking a ball and pushing it in between cubes that were clumped together so that it looked different each match and was more random.

Thanks in advance for your guidance.

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A: Navigation targets should be places 5.75 inches from the floor tiles to the center of the image, and the image should be flush with the Lexan/plastic panel.

Originally posted by FTC9808

Subject: Navigation Target Placement

Q: Should the targets be attached to (flush in contact with) the plastic wall, and not simply hanging from the metal rail? Please shed some light on this for an remaining Rover Ruckus events. Thank you.

A: Navigation targets should be places 5.75 inches from the floor tiles to the center of the image, and the image should be flush with the Lexan/plastic panel.

Originally posted by FTC14019

Subject: Field Setup at Championship
Q:
Last year in Houston, there were large rugs placed under the competition fields that affected the gameplay of robots. Just so that teams can prepare for the change, will there be similar rugs under the fields or will the fields be on the bare concrete of the convention center?

A: The same carpets used at last years Championships, both in Houston and Detroit, will be used under the competition fields again this year.

Q1: What is the appropriate vertical orientation of the Alliance Station relative to the Playing Field? The visuals in both Game Manual Part 2 and the Field Setup Guide show that the floor of the Alliance Station is level with the floor of the Playing Field. However, this is not specified in the text of either document.

Q2: How high can the Playing Field be elevated and still be considered a correctly set Playing Field?

Q3: Will the Playing Fields at Minute Maid Park in Houston and Ford Field in Detroit be subject to this rule?

A1: Alliance Stations should consist of tape placed on the floor outside of the field perimeter and follow the specs outlined in the Field Setup Guide. Alliance Stations should not be elevated as this could create a safety hazard for both teams and field volunteers.

A2: There are no rules that state how high a playing field can be elevated at an event. However Event Organizers should keep in mind that Field Reset volunteers must access the field consistency throughout the day to reset the field for the next match. Teams must also enter and exit the field to place and retrieve their robots. In most levels of competition, elevating the field for a full competition creates an obstacle that could cause unnecessary match schedule delays and safety risks.

A3: The playing fields at both Minute Maid Park in Houston and Ford Field in Detroit will be elevated no more than 24” for finals matches. The fields throughout the competition at both Championships will be placed on the floor and will not be elevated.

Last edited by Giorgio Tsoukalos; 03-28-2019, 12:30 PM.
Originally posted by FTC14019

Subject: Carpets Under Practice Fields at Championship

Q: Because there will be rugs under the actual fields in Houston, can the venue put rugs under the practice fields as well?

A: Carpets will not be placed under the practice fields at either the Houston or Detroit Championships. They will only be placed under the competition fields at each location. Note that the pile of the carpet is minimal, and should make little to no difference in drivability from the practice to the competition fields.
The Engineering Notebook - Answers

09-19-2018, 03:42 PM

Answers to questions about the Engineering Notebook can be found in this section.

Giorgio Tsoukalos
Senior Member
Join Date: Nov 2013
Posts: 106

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Tags: None

Stuck

01-23-2019, 12:41 PM

Originally posted by FTC12676
Subject: Engineering notebook in electronic form- blank spaces

Q: We are using electronics engineering notebook as it becomes easy for team members to collaborate and fill after every meeting. Do we need to mark X in blank spaces?

A: Engineering notebooks do not have a requirement to mark X in blank spaces but it is a best practice to not leave any blank space and it is suggested for electronic notebooks to print on both sides of a piece of paper. Game Manual 1 is where the engineering notebook requirements are outlined.
A: Your summary is correct. The engineering notebook is required to be eligible for any judged award but does not have any bearing on match play.

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Subject: 3 inches per Engineering Notebook

Q: The guidelines for the engineering notebook state:

"teams must print out their engineering notebooks and place them in a binder, no larger than 3 in (7.62cm) and no more than 2 binders."

3 questions:

1- I assume that makes it 3 inches per binder----so a team could have a total of 6 inches in two binders.
2- if a team has 1 notebook that's more than >6 inches thick-- does that require a judging panel to disqualify the teams notebook-eliminating them from any award possibilities?
3- if a team has 1 notebook that's more than >4 inches thick-- does that require a judging panel to disqualify the teams notebook-eliminating them from any award possibilities?

A: We don't want judges to disallow (or disqualify) teams or notebooks if they can help it and judges should not have to bring a ruler to measure the engineering notebooks. Judges should evaluate notebooks on content - then if there are 2 notebooks or teams that judges really can not decide between, then one way to break the tie is to look for the notebook that is more compliant to the rules. Teams should be aware of the judging
guidelines and strive to follow them.

Last edited by Mae Jemison; 02-14-2019, 11:21 AM.
Answers to your questions about the Judges Interview can be found in this section.

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Originally posted by sstoudthansen2017

Subject: Community Outreach - Do Internships Count?

**Q:** Based on many years of experience gained from being in FIRST our team members landed summer internships with local companies utilizing their coding, CAD, etc. skills. They spent the summer learning from many STEM professionals gaining critical knowledge that they brought back to the team to learn and utilize during the season. Can this time be counted as community outreach since they gained deep understanding and learned from STEM professionals and made connections with the engineering community as teams would if they toured a company? They also engaged with the company’s professionals to get them involved with FIRST. Thank you!

**A:** What wonderful opportunities for the team members. I believe you are asking about the Connect Award. From Game Manual 1, criteria includes that the team provides clear examples of developing in person or virtual connections with individuals in the engineering, science, or technology
community and the team actively engages with the engineering community to help them understand FIRST, the FIRST Tech Challenge, and the Team itself. Sure sounds like a summer internship would absolutely be something to highlight when talking to judges.

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Mae Jemison
Junior Member

Join Date: Nov 2014
Posts: 0

01-23-2019, 01:03 PM

Originally posted by FTC8397

Subject: Team using video for judging presentation

Q: Had a team in Judging today that used a 4-minute video for most of their 5-minute presentations...any rules about using video instead of speaking

A: There is no rule about this - so yes, in theory, a team can incorporate video as part of their team's presentation. However, teams should take into consideration that a pre-recorded video may or may not be effective. Depending on how the video is presented - such as from a laptop - judges may have a hard time seeing or hearing the presentation. Also due to the varying nature of venues for the judging interviews, there are events that would not have be able to access a power outlet in the judging interview rooms and a team will not be given extra time to setup for a video presentation.

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Giorgio Tsoukalos
Senior Member

Join Date: Nov 2013
Posts: 106

Today, 01:26 PM

Originally posted by FTC13259

Subject: Judging and Mentor Involvement

Q: In some cases, mentors are very hands-off and in other cases mentors are active (to very active) with the team. For example, a mentor may help arrange for interactions with different corporations and organizations or complete paperwork needed for a grant. Is it reasonable for the FTC team to take credit in the engineering notebook for the activities/grants that were facilitated/initiated by their mentor but assisted with or completed by team members?

A: A team should not be penalized if their coach or mentor initiated an activity or grant, as this is part of their role as being a mentor to the team. It is reasonable for the team to get credit for that activity, especially if the mentors role was to assist in making the connection, while the students did the rest of the work. A good way for a Judge to gauge the students involvement in the activity is to ask specific questions about their participation.
Stuck
Advancement - Answers
09-19-2018, 03:45 PM

Find answers to questions about Advancement to the next event level here.

Tags: None

Giorgio Tsoukalos
Senior Member
Join Date: Nov 2013
Posts: 106

12-06-2018, 10:02 AM

Originally posted by FTC10673
Subject: TieBreaker Points

Q: Could someone explain the rationale behind the TieBreaker points? It seems to me that it does not encourage Gracious Professionalism, nor reflects a teams performance. It does not encourage Gracious Professionalism because if a team does well in a match, being on track to score 150 plus points, and the opposing alliance didn't have one of their robots land, a team is "encouraged" to get penalties to bolster their opposing alliance's score, in case they are faced with a tiebreaker situation.

A: TieBreaker points are awarded based on the losing alliances pre-penalized score. In the scenario described, each alliance will still only receive the pre-penalized score of the losing alliance, regardless if the alliance that is performing well in the match attempts to obtain penalties to boost the losing alliances score. Section 5.8 in the Game Manual part 1 provides a full explanation along with examples of how TieBreaker points are awarded.
Originaly posted by FTC4962

Subject: FIRST Championship and Religious Holidays

Q: We are looking for a clarification about the conflict of the Houston World Championship with major religious holidays. Will teams that advance to Houston but are not permitted to attend that Championship due to religious reasons (for instance, our school will not allow us to compete that week due to Holy Week / Easter) be able to trade spots with a Detroit-bound team or otherwise be considered for the Detroit championship?

FRC has come out with a policy that can be found on their blog:

https://www.firstinspires.org/roboti...on-cmp-houston

and we know that exemptions have been already made for some religious groups. The FRC team at our school has already applied for an exemption in the event that they qualify, but we haven’t heard any additional information about this from FTC.

Our state championship is coming up in a couple of weeks, and the answer to this question may dictate how alliance selection plays out, since only the Winning Alliance Captain is guaranteed an advancement slot to the FIRST Championship, and there are other teams at the event besides us who are in this same situation. That is, the decision to accept an alliance invitation or not may come down to if an affected teams will be allowed to advance to the next level or not.

Thank you for your consideration.

A: We recognize that the holidays which fall on the Houston Championship can create challenges for teams who directly advance to the Houston Championship. FIRST Tech Challenge Championship spots have very limited flexibility. Since your team has not qualified currently, we cannot make any guarantees that we can swap teams between events.

We ask that FIRST Tech Challenge teams email any requests for exceptions AFTER they qualify for the Championship. If a team has already confirmed their advancement to the Championship and would like to request an exception, please email FTCTeams@firstinspires.org. Requests made prior to confirmed advancement are not being considered at this time.