

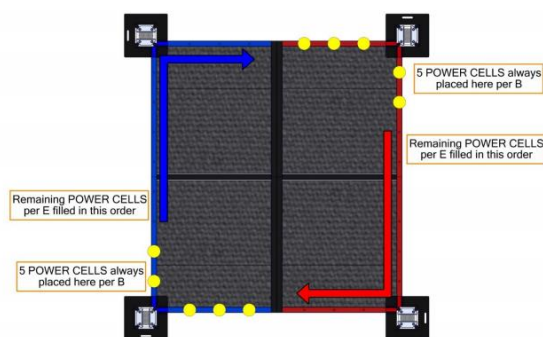
Team Update 00

Team Update 00 details the changes of consequence between the 2020 and 2021 INFINITE RECHARGESM Game Manual.

SUMMARY OF CHANGES

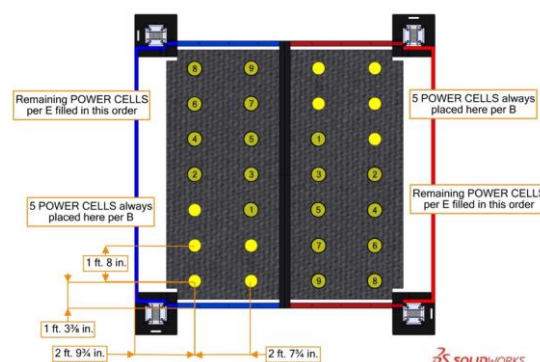
This section provides a brief and non-exhaustive summary of the changes made to INFINITE RECHARGE for the 2021 season. For full details, see the following pages of this document, and read the [2021 Game Manual](#).

- **RENDEZVOUS POINT:** The Black BOUNDARIES that bisected an ALLIANCE's RENDEVOUS POINT have been removed. The Red and Blue BOUNDARIES nearest to the TRENCH RUNS have been removed and replaced with tape lines (note the tape lines are aligned to the far edge of the Truss Bases, resulting in the RENDEVOUS POINT becoming slightly larger). See 3.2 Zones and Markings for details.
- **RENDEVOUS POINT - POWER CELLS:** POWER CELLS that were staged on BOUNDARIES will now be staged on the Floor Protection inside the RENDEVOUS POINT. See Figure 0-1 and Figure 0-2 for details.



2020

Figure 4-2: POWER CELL setup on BOUNDARIES



2021

Figure 4-2: POWER CELL setup inside RENDEZVOUS POINT

- **SHIELD GENERATOR Scoring:** Stage 2 and 3 CAPACITIES and POWER CELL ACTIVATION requirements have decreased from twenty (20) POWER CELLS scored to fifteen (15). See Table 0-3 for details.
- **CONTROL PANEL Scoring:** The value of ROTATIONAL CONTROL has increased from ten (10) to fifteen (15) points. See Table 0-4 for details.
- **DRIVE TEAM:** An adult mentor may be a COACH or TECHNICIAN. There may not be more than one (1) adult on DRIVE TEAM. See Section 4.6 DRIVE TEAM for details.
- **POWER CELLS in ALLIANCE STATION:** The number of POWER CELLS allowed to be held in an ALLIANCE STATION has decreased from fifteen (15) to fourteen (14). See H9 and H10 for details.
- **Bill of Material, ROBOT Total Cost Limit, and Pre-Kickoff Designed or FABRICATED ITEM Requirements** have been removed for the 2021 season. See Section 9.4 Budget Constraints & Fabrication Schedule for a list of removed rules. For details of the removed rules reference the [2020 Game Manual](#).
- **BUMPERS:** Bumpers are permitted to have non-alliance specific colors on their corners for the 2021 season. See R21 and R24D for details.

GENERAL

- [Field Tour Videos](#) from 2020 have been modified for 2021 to note major changes the field and scoring. 2021 Field Tour Videos can be found on the *FIRST* Robotics Competition YouTube page.
- The [Game Animation](#) has been updated and can be found on the *FIRST* Robotics Competition YouTube page..
- The [Playing Field Webpage](#) lists the CAD and VR assets that have been updated for 2021.

FIRST® Official Field Drawings

All changes captured in this section are compared to the last updated versions of the *FIRST* Official Field Drawings (updated March 3, 2020) and the Layout and marking Diagram (updated January 31, 2020). Changes were designed to improve overall functionality of the field and were reactionary based on FIELD performance throughout the brief 2020 season. [FIRST Official Field Drawings can be found on the Playing Field webpage.](#)

- Parts that have been modified or added for the 2021 season have been updated with a 2021 part number (e.g. the SHIELD GENERATOR was updated from GE-20000 to GE-21000). Modified parts and assemblies have revision tables that detail specific changes.
- The [Layout and Marking Diagram](#) has been updated per changes described throughout this document.
- The [Field drawings – season specific](#) package has been updated with the following changes:
 - SHIELD GENERATOR (GE-21000, previously GE-20000):
 - BOUNDARIES and floor protection have been updated per changes described in the ARENA section.
 - GENERATOR SWITCH sensor assemblies have been updated to improve reliability.
 - TRENCH (GE-21100, previously GE-20100):
 - Retaining tab bolt stack updated for consistency and reliability of performance.
 - LOADING BAY (GE-21200, previously GE-20200):
 - Flat ramps have been added to each chute to reduce the frequency of jams.
 - POWER PORT (GE-21300, previously GE-20300):
 - Subassemblies updated to improve reliability and reduce frequency of jams in the BOTTOM PORT
 - POWER CELL (GE-21500, previously GE-20500):
 - Updated to specify logo may not be present on game piece.

EVENT MANUAL

The Event Manual has not been updated for the 2021 season. It will be updated if and only if in-person events are approved.

GAME MANUAL

The Game Manual has been updated for the 2021 season of INFINITE RECHARGE. All changes captured in this document are compared to the last published 2020 Game Manual ([updated on March 10, 2020 \[Team Update 17\]](#)). Updates include:

- Changed document name from Game and Season Manual to Game Manual
- Styled to match the 2021 season
- Changed references from 2020 to 2021
- Updated images to reflect the 2021 FIELD

- Select images are shown in Team Update 00 to highlight the substantive differences
- Fixed minor typos/formatting errors (these are not detailed in Team Update 00)

Section 1 Introduction

Section 1 has been updated to reflect adaptations for the 2021 season, including the addition of [At Home Challenges Manual](#). Section 1 is identical in the At Home Challenges Manual and Game Manual, except for section 1.6, and sections beyond 1.9 (applicable only to the At Home Challenges Manual).

- Spirit of Volunteering Section has been removed due to the uncertainty surrounding in-person events for 2021. The Chief Volunteers look forward to working with all volunteers again in 2022.
- Section 1.8 Team Updates: Team Updates will be posted biweekly through Tuesday, February 2, 2021. Additional Team Updates and their posting frequency will be announced if an in-person season is approved.
- Section 1.9 Question and Answer System sponsored by Autodesk®: reorganized for readability and additional language has been added to permit hypothetical questions. The Q&A account FRC 99999 has been created to post questions related to content asked by key volunteers that are relevant to teams.
 - Event specific language in Section 1.9 is only shown in the Game Manual

Section 2 Game Overview

Updated with the 2021 INFINITE RECHARGE FIELD.

Section 3 ARENA

3.1 FIELD

The SHIELD GENERATOR consists of the structure, the GENERATOR SWITCHES, the BOUNDARIES, and the floor protection **RENDEZVOUS POINT**.

3.2 Zones and Markings

RENDEZVOUS POINT: a **5 6 ft. 6 9 ¼ in. (~170 208 cm)** wide, 12 ft. 6 ¾ in. (~383 cm) deep, infinitely tall volume formed by the ALLIANCE colored BOUNDARIES, **ALLIANCE colored tape**, and the black BOUNDARY pair that divides the RED and the Blue BOUNDARIES. The RENDEZVOUS POINT includes the ALLIANCE colored BOUNDARIES and **ALLIANCE colored tape**.

3.3 SHIELD GENERATOR

The SHIELD GENERATOR is a 14 ft. 1 ½ in. (~431 cm) wide, 15 ft. ¾ in. (~459 cm) deep, and 9 ft. 6 ½ in. (~291 cm) tall structure located in the center of the FIELD, oriented at a 22.5 degree angle relative to the guardrails. The SHIELD GENERATOR has one (1) GENERATOR SWITCH per ALLIANCE. **Black BOUNDARIES** divide the floor of the SHIELD GENERATOR into **two** sections. Spaces between BOUNDARIES include flooring protection to prevent floor damage. **All flooring between the RENDEZVOUS POINTS (including ALLIANCE colored BOUNDARIES, ALLIANCE colored tape, and floor protection) are** is part of the SHIELD GENERATOR.

3.3.3 BOUNDARIES

BOUNDARIES are 3 in. (~8 cm) wide, 1 in. (~3 cm) tall steel barriers that divide the area inside the SHIELD GENERATOR into **four (4) two (2) equal sized rectangles areas** that are **5 6 ft. 3 9 ¼ in. (~162 208 cm)** wide by **5 12 ft. 10 7 8 ¾ in. (~180 368 cm)** deep. BOUNDARIES are secured to the carpet using hook fastener which increases the height to approximately 1 ½ in. (~3 cm). The Red and Blue BOUNDARIES feature 1-in. (~3 cm) diameter holes spaced every 1 ft. 4 ½ in. (~42 cm) for staging POWER CELLS. A pair of black BOUNDARIES divide the Red and Blue RENDEZVOUS

POINTS. Each truss base has two shorter steel barriers, black with ALLIANCE colored tape, mounted to them. These barriers are ALLIANCE colored BOUNDARIES.

A layer of 1/8 in. (~3 mm) thick hardboard is installed on top of the FIELD carpet and covered with another layer of carpet to protect venue flooring. This flooring protection adds approximately 3/8 in. (~10 mm) of height to the this area between the BOUNDARIES. The floor protection features 1-in. (~3 cm) diameter holes used for staging of POWER CELLS. Holes are placed in a rectangular pattern with 2 ft. 7 3/4 in. (~81 cm) wide by 1 ft. 8 in. (~51 cm) deep spacing, as seen in Figure 4-2.

3.4.1.3 POWER PORTS

Around the OUTER PORT a Phillips Color Kinetics LED Light String is used to indicate the progress towards CAPACITY. The string fills symmetrically starting from the top center and proceeding out, then down. The initial nodes for each Stage (starting from the center) light up in sections that differ depending on the CAPACITY of the current Stage. The bottom four nodes on either side of the OUTER PORT always fill at a rate of one (1) node per POWER CELL scored. Examples are shown in Figure 3-17.

A Phillips Color Kinetics LED light string around the OUTER PORT indicates CAPACITY progress. The string fills from the top center toward the side bottom left and right nodes symmetrically, as shown in Figure 3-17.

and is mirrored on the left and right. Nodes 1-4 and 27-30 fill per POWER CELL scored. Nodes above them light up in sections that differ. While the node pattern differs depending on the CAPACITY of the current Stage, as defined in Table 3-1, the bottom four nodes on either side of the OUTER PORT always fill at a rate of one node per POWER CELL scored. A node map is shown in Figure 3-18.

Table 0-1 Node pattern per CAPACITY

CAPACITY	Stage 1 nodes ON	Stage 2 and 3 nodes ON
1	14-17	15 and 16
2	11-13 and 18-20	14-17
3	9-10 and 21-22	14 and 17-13-18
4	7-8 and 23-24	12-19
5	5-6 and 25-26	13 and 18-11-20
6	4 and 27	10-21
7	3 and 28	12 and 19-9-22
8	2 and 29	8-23
9	1 and 30	7-24
10	N/A	11 and 20-6-25
11	N/A	10 and 21-5-26
12	N/A	9 and 22-4-27
13	N/A	8 and 23-3-28
14	N/A	7 and 24-2-29
15	N/A	6 and 25-1-30
16	N/A	5 and 26
17	N/A	4 and 27
18	N/A	3 and 28
19	N/A	2 and 29
20	N/A	1 and 30

Table 0-2 Additional POWER PORT light states

Light State	Criteria
Off	Outside of a MATCH: FIELD is MATCH ready In MATCH: current Stage not ACTIVATED
Green	Head REFEREE has determined FIELD is safe for humans
Green with white	Head REFEREE has determined FIELD is safe for humans. See TIMEOUTS for more details.
ALLIANCE color with yellow chase pattern	Stage has reached CAPACITY, but not ACTIVATED
Entire light string is ALLIANCE color	All Stages ACTIVATED

Section 3.5.1 Control Panel

A swatch of identical material and colors to those on the CONTROL PANEL is in each **Black Gray** Tote of the [2020 Kickoff Kit](#). The CONTROL PANEL is attached to the TRENCH via a 12 in. (~30 cm) Lazy Susan Bearing (Triangle Manufacturing PN: 12D10346). An identical Lazy Susan Bearing is in each **Black Gray** Tote of the [2020 Kickoff Kit](#). Teams that participated in the 2020 season received these items in the **Black Tote** of the 2020 Kickoff Kit.

3.6 POWER CELL

INFINITE RECHARGE is played with POWER CELLS. A POWER CELL is a yellow 7 in. (~18 cm) diameter Medium Bounce Dino-Skin foam ball. The FIRST logo is **may be** printed on each ball in black ink. The ball is made by Flaghouse (PN 1892 YEL) and sold by AndyMark (PN AM-4200a) **without a FIRST logo**. A **Three (3) POWER CELLS** is **are** in each **Black Tote** of the [2020 Kickoff Kit](#).

3.7 Vision Targets

Vision targets made from 2 in. (~5 cm) wide strips of 3M 8830 Scotchlite™ Reflective Material are located on the POWER PORTS and LOADING BAYS. On the POWER PORT, they target the location of the INNER and OUTER PORTS and trace the bottom perimeter of the OUTER PORT. The target has an overall height of 1 ft. 5 in. (~43 cm), and a width of 3 ft. 3¼ in. (~100 cm). The bottom of the target is 6 ft. 9¼ in. (~206 cm) above the carpet. A **8 ft. (~243 cm)** strip of 3M 8830 Scotchlite™ Reflective Material is in **each Kickoff Kit** and additional strips are available in [FIRST Choice](#).

Section 4 MATCH Play

4.1.1 POWER CELLS

Forty-eight (48) POWER CELLS are staged as follows:

- A. five (5) POWER CELLS in each of the two (2) TRENCH RUNS
 - i. two (2) POWER CELLS are placed on each of the TRENCH baseplates further away from the center of the FIELD.
 - ii. three (3) POWER CELLS are placed centered in the width of each TRENCH RUN, spaced at 3-ft. (~91 cm) intervals. Small rings are used to keep them in place prior to the start of a MATCH. Rings are ⅛ in. (~3 mm) thick, 1¼ in. (~4 cm) diameter O-rings (McMaster Item#: 9452K63). Rings are secured to the carpet by tape.
- B. five (5) POWER CELLS placed on the **BOUNDARIES floor protection** inside each ALLIANCE'S RENDEZVOUS POINT as shown in Figure 4-2.
- C. five (5) POWER CELLS on the racks in each ALLIANCE STATION'S LOADING BAY,

- D. each of the three (3) teams may preload up to three (3) POWER CELLS in their ROBOT, such that they are fully and solely supported by that ROBOT, and
- E. remaining POWER CELLS (zero (0) to nine (9) per ALLIANCE, depending on decisions made in D) ~~in the holes in the BOUNDARIES in~~ inside the corresponding ALLIANCE'S RENDEZVOUS POINT as shown in Figure 4-2.

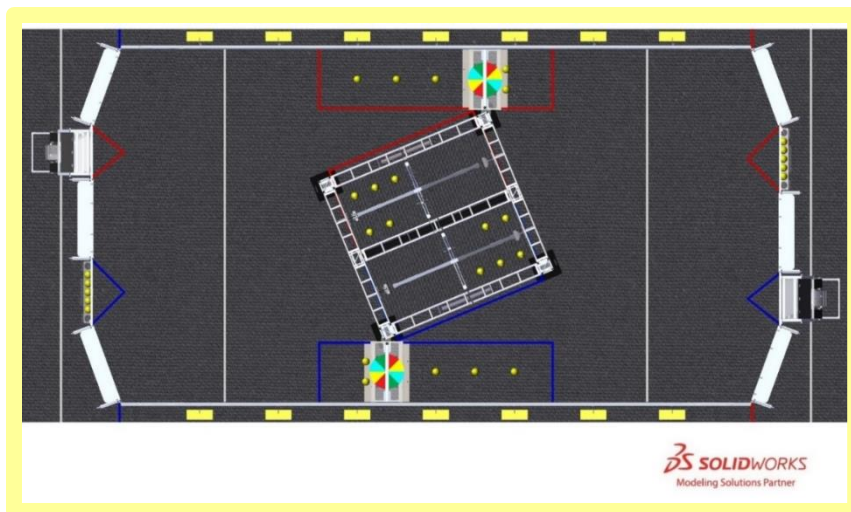


Figure 0-1: POWER CELL setup

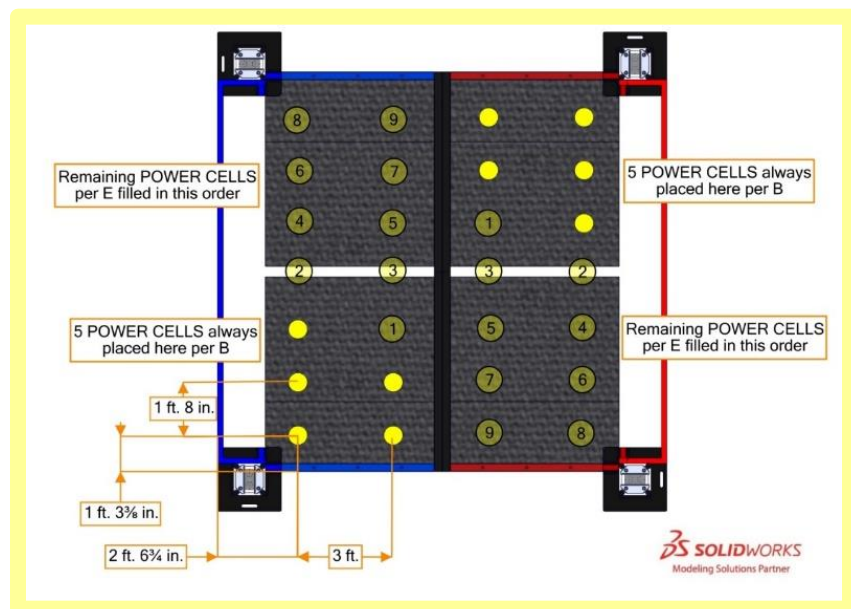


Figure 0-2: POWER CELL setup on ~~BOUNDARIES~~ inside RENDEZVOUS POINT

4.4.2 SHIELD GENERATOR Scoring

Table 0-3: SHIELD GENERATOR ACTIVATION requirements

Stage	CAPACITY	ACTIVATED when...
1	9	nine (9) POWER CELLS are scored & TELEOP has begun
2	20 15	twenty (20) fifteen (15) POWER CELLS are scored in Stage 2 & ROTATION CONTROL is complete
3	20 15	twenty (20) fifteen (15) POWER CELLS are scored in Stage 3 & POSITION CONTROL is complete

4.4.5 Point Values

Table 0-4: Point values

Award	Awarded for...	AUTO	TELEOP	Qual.
INITIATION LINE	exit the infinite vertical volume created by the corresponding ALLIANCE'S INITIATION LINE any time before the end of AUTO (per ROBOT)	5	-	-
POWER CELLS	scored in BOTTOM PORT	2	1	-
	scored in OUTER PORT	4	2	-
	scored in INNER PORT	6	3	-
CONTROL PANEL	ROTATION CONTROL	-	10 15	-
	POSITION CONTROL		20	
ENDGAME Points	HANG (per ROBOT)	-	25	-
	PARK (per ROBOT)	-	5	-
	LEVEL with 1-3 ROBOTS HANGING (per ALLIANCE)		15	
SHIELD GENERATOR OPERATIONAL	earning at least sixty-five (65) ENDGAME points			1 Ranking Point
SHIELD GENERATOR ENERGIZED	Stage 3 ACTIVATED	-	-	1 Ranking Point
Tie	completing a MATCH with the same number of points as your opponent	-	-	1 Ranking Point
Win	completing a MATCH with more points than your opponent	-	-	2 Ranking Point

4.6 DRIVE TEAM

A DRIVE TEAM is a set of up to five (5) people from the same *FIRST Robotics Competition* team responsible for team performance for a specific MATCH. There are four (4) specific roles on a DRIVE TEAM which ALLIANCES can use to assist ROBOTS with INFINITE RECHARGE. Only one (1) of the five (5) DRIVE TEAM members is permitted to be an adult mentor.

Table 0-5 DRIVE TEAM roles

Role	Description	Max./ DRIVE TEAM	Criteria
COACH	a guide or advisor	1	Pre-college student or adult mentor Must wear "COACH" button
DRIVER	an operator and controller of the ROBOT	3	Pre-college student Must wear one (1) of the three (3) "DRIVE TEAM" buttons
HUMAN PLAYER	a POWER CELL manager		
TECHNICIAN	a resource for ROBOT troubleshooting, setup, and removal from the FIELD	1	Pre-college student or adult mentor Must wear "TECHNICIAN" button

4.7 Other Logistics

An ARENA FAULT is not called for MATCHES that accidentally begin with an incorrect number of, incorrectly positioned, or damaged POWER CELLS. Damaged POWER CELLS are not replaced until the next ARENA reset period. DRIVE TEAMS should alert the FIELD STAFF to any missing or damaged POWER CELLS prior to the start of the MATCH. POWER CELLS are expected to experience wear during events and may be repaired using the guidelines detailed in this [POWER CELL Guide](#).

Once the MATCH is over and the Head REFEREE determines that the FIELD is safe for FIELD STAFF and DRIVE TEAMS, they or their designee change the LED lights to green or green with white and DRIVE TEAMS may retrieve their ROBOT.

In addition to the two minutes and thirty seconds (2:30) of game play, each MATCH also has pre- and post-MATCH time for setup and reset of the ARENA. During ARENA reset, the ARENA is cleared of ROBOTS and OPERATOR CONSOLES from the MATCH that just ended. The ROBOTS and OPERATOR CONSOLES for the subsequent MATCH are loaded into the ARENA by DRIVE TEAMS at this time. FIELD STAFF also use this time to reset ARENA elements and POWER CELLS.

Section 5 Safety Rules

S2. Wait for the green lights. Team members may only enter the FIELD if the POWER PORT LEDs are green or green with white, unless explicitly instructed by a REFEREE or an FTA.

Violation: Verbal warning. If repeated at any point during the event, YELLOW CARD. If egregious, RED CARD.

Egregious violations of S2 include, but are not limited to:

- pushing past the FIELD reset person blocking an open gate to get on the FIELD

- b. ignoring a warning to not go on the FIELD

Section 6 Conduct Rules

C7. Be prompt/safe when coming to and going from the FIELD. DRIVE TEAMS may not cause significant or repeated delays during the event to the start of a MATCH, the FIELD reset after a MATCH, or continuation of MATCHES after a TIMEOUT.

Violation: If prior to the MATCH, the offending DRIVE TEAM'S ROBOT will be DISABLED. If after the MATCH, YELLOW CARD.

DRIVE TEAMS are expected to stage their ROBOTS for a MATCH, and remove it from the FIELD afterwards, safely and swiftly. Examples of violations include, but are not limited to:

- late arrival to the FIELD (including across different MATCHES and after a FIELD or ALLIANCE TIMEOUT)
 - failing to exit the FIELD once a MATCH is ready to begin (indicated by the green LEDs have turned off)
 - installing BUMPERS, charging pneumatic systems, or any other ROBOT maintenance once on the FIELD
 - use of alignment devices that are external to the ROBOT (e.g. a DRIVE TEAM could bring and use a measuring tape, as long as there is no delay to the MATCH by doing so)
 - failing to remove OPERATOR CONSOLES from the PLAYER STATIONS in a timely manner
- At the conclusion of a TIMEOUT, ROBOTS are expected to be staged on the FIELD prior to the timer displaying zero (0) and ready for the MATCH to start.

There are no rules that prohibit use of hand tools (including battery operated tools) while setting up and/or removing ROBOTS from the FIELD provided they do not cause significant delay or safety concern.

C11. Don't trick the sensors. Teams may not interfere with any automated scoring hardware.

Violation: RED CARD for the ALLIANCE.

7 Game Rules: ROBOTS

7.1 Before/After the MATCH

G1. Know your ROBOT setup. When placed on the FIELD for a MATCH, each ROBOT must be:

- in compliance with all ROBOT rules, i.e. has passed inspection (for exceptions regarding Practice MATCHES, see [Inspection & Eligibility Rules](#)),
- the only team-provided item left on the FIELD by the DRIVE TEAM,
- confined to its STARTING CONFIGURATION,
- positioned such that its BUMPERS are intersecting the infinite vertical volume created by the corresponding ALLIANCE'S INITIATION LINE, and
- fully and solely supporting not more than three (3) POWER CELLS (as described in [Setup](#).)

Violation: If fix is a quick remedy, the MATCH won't start until all requirements are met. If it is not a quick remedy the offending ROBOT will be DISABLED and, at the discretion of the Head REFEREE, must be re-inspected.

Teams are encouraged to position ROBOTS such that it is clear to REFEREES that G1-D is not violated.

If a ROBOT is BYPASSED prior to the start of the MATCH, the DRIVE TEAM may not remove the ROBOT from the FIELD without permission from the Head REFEREE or the FIRST Technical Advisor (FTA).

G2. Teams may not enable their ROBOTS on the FIELD. Teams may not tether to the ROBOT while on the FIELD except in special circumstances (e.g. during TIMEOUTS, after Opening Ceremonies, before an immediate MATCH replay, etc.) and with the express permission from the FTA or a REFEREE.

Violation: *YELLOW CARD.*

FMS will not enable ROBOTS after the conclusion of the MATCH.

Teams are encouraged to consider rule C7 when developing their ROBOTS.

Tethering includes any wired or wireless connection used to electrically energize and/or control elements on the ROBOT. The safety of teams and volunteers in close proximity to ROBOTS and ARENA elements on the FIELD is of the utmost importance, therefore ROBOTS or ROBOT COMPONENTS may not be enabled in any way on the FIELD once the MATCH has concluded.

ROBOTS need to be safely transported off the FIELD and back to the pits after the MATCH, and there may be bystanders, doorways or height restrictions along the route.

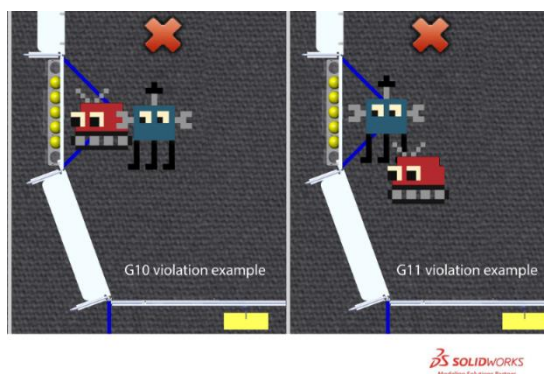
7.2.3 Zone Specific Restrictions

G11. Give opponents some space. An opponent ROBOT may not contact a ROBOT whose BUMPERS are intersecting its TARGET ZONE or LOADING ZONE, regardless of who initiates contact. ROBOTS in violation of G10 are exempt from this rule.

Violation: *TECH FOUL per instance.*

The initiator of the contact is not a factor when determining violations of this rule.

Teams should take note that they are putting themselves at great risk for TECH FOULS if they choose to approach an opponent ROBOT intersecting its TARGET ZONE or LOADING ZONE.



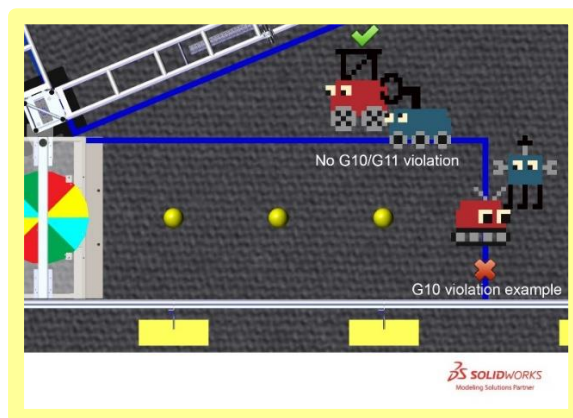


Figure 0-3 G10 and G11 examples

G12. Leave the opponent's CONTROL PANEL alone. During TELEOP, a A-ROBOT may not contact the opponent's CONTROL PANEL, either directly, or transitively through a POWER CELL, if

- A. the opponent ROBOT is contacting that CONTROL PANEL, and
- B. the opponent's POWER PORT has reached CAPACITY

Violation: In Qualifications MATCHES, opponents are awarded one (1) SHIELD GENERATOR ENERGIZED Ranking Point if not completed at the conclusion of the MATCH. In Playoff MATCHES, TECH FOUL.

7.2.5 ROBOT to ROBOT Interaction

G25. Damaging other ROBOTS, not allowed. Regardless of intent, a ROBOT may not initiate direct contact inside the vertical projection of an opponent ROBOT'S FRAME PERIMETER that damages or functionally impairs the opponent ROBOT.

ROBOTS with BUMPER gaps are at their own risk regarding damaging contact in these areas by ROBOTS that remain completely inside their own FRAME PERIMETER, other than BUMPERS, as they are not in violation of this rule.

Violation: TECH FOUL and YELLOW CARD.

Some examples of violations of this rule include, but are not limited to:

- a. an extension damages a COMPONENT inside an opponent ROBOT'S FRAME PERIMETER
- b. an extension powers off an opponent's ROBOT
- c. an extension relieves an opponent's ROBOT'S air pressure.
- d. a ROBOT that unintentionally extends outside its FRAME PERIMETER while tipping and damages a COMPONENT inside an opponent ROBOT'S FRAME PERIMETER

At the conclusion of the MATCH, the HEAD REFEREE may elect to visually inspect a ROBOT to confirm violations of G25 made during a MATCH and remove the violation if the damage cannot be verified.

For the purposes of G25, "initiate direct contact" requires movement towards an opponent ROBOT.

In a collision, it's possible for both ROBOTS to initiate direct contact.

8 GAME RULES: HUMANS

8.2 During the MATCH

H8. This rule has been renumbered as C11.

H9. POWER CELLS, recycle. During TELEOP, an ALLIANCE may not have more than ~~fifteen (15)~~ **fourteen (14)** POWER CELLS in their ALLIANCE STATION.

Violation: FOUL per POWER CELL.

If the POWER CELL count exceeds ~~fifteen (15)~~ **fourteen (14)**, excess POWER CELLS must be introduced into the FIELD immediately.

As soon as a ~~sixteenth~~ **fifteenth** POWER CELL arrives in the ALLIANCE STATION, the ALLIANCE should be making a concerted good will effort to enter any extra POWER CELLS back on to the FIELD as quickly and as safely as possible.

There is no intent to issue penalties for delays due to DRIVERS or HUMAN PLAYERS having to move around their ALLIANCE partners while attempting to clear surplus POWER CELLS or because TELEOP began with more than ~~fifteen (15)~~ **fourteen (14)** POWER CELLS in the ALLIANCE STATION due to scoring by opponents during AUTO. However, if a team is perceived as lagging in the judgement of a REFEREE, they will be issued a penalty.

It is the HUMAN PLAYERS' responsibility to be aware of their surroundings.

H10. POWER CELLS go on the rack. POWER CELLS must be stored on the LOADING BAY racks. An ALLIANCE making a concerted, good-will effort to transport POWER CELLS from the CORRAL to a rack or Chute is not in violation of this rule.

VIOLATION: FOUL. If repeated, TECH FOUL.

The LOADING BAY rack holds fourteen (14) POWER CELLS and enables teams and REFEREES to count POWER CELLS in an ALLIANCE STATION. ~~An ALLIANCE holding the fifteenth POWER CELL is not in violation of H10.~~

H10 means that POWER CELLS may neither be stored in the CORRAL during the MATCH nor are they required to contact the LOADING BAY rack before entering the FIELD.

As G4 prohibits using the rack during AUTO, an ALLIANCE that removes POWER CELLS from the CORRAL during AUTO and waits to place them on the rack until the start of TELEOP is making a "concerted good-will effort."

Teams are encouraged to make it clear to REFEREES that H10 is not violated.

Section 9 Robot Rules Section

9.1 Overview

There are many reasons for the structure of the rules, including safety, reliability, parity, creation of a reasonable design challenge, adherence to professional standards, impact on the competition, and compatibility with the Kit of Parts (KOP). The KOP is the collection of items listed on the ~~current season's~~ **2020 and 2021** Kickoff Kit Checklists, distributed to the team via FIRST Choice in the ~~current~~ **2020 and/or 2021** season, or paid for completely (except shipping) with a Product Donation Voucher (PDV) from the ~~current~~ **2020 and/or 2021** season.

Teams may be asked to provide documentation proving legality of non-2020 or 2021 KOP items during Inspection where a rule specifies limits for a legal part (e.g. pneumatic items, current limits, COTS electronics, etc.).

9.3 ROBOT Safety & Damage Prevention

R9. ROBOTS must allow removal of game pieces from the ROBOT and the ROBOT from FIELD elements while DISABLED and powered off.

ROBOTS will not be re-enabled after the MATCH, so teams must be sure that game pieces and ROBOTS can be quickly, simply, and safely removed.

Teams are encouraged to consider rule C7 when developing their ROBOTS.

9.4 Budget Constraints & Fabrication Schedule

R11. This rule has been removed for the 2021 season.

R12. No individual, non-KOP item or software shall have a Fair Market Value that exceeds \$500 USD. The total cost of COMPONENTS purchased in bulk may exceed \$500 USD as long as the cost of an individual COMPONENT does not exceed \$500 USD

Teams should be ready to show inspectors documentation of Fair Market Value (FMV) for any COMPONENTS that appear to be in the range of the \$500 USD limit.

The Analog Devices ADIS16448 IMU MXP Breakout Board does not have a published Fair Market Value (FMV). This device is considered to comply with R12 regardless of its true FMV.

The FMV of a COTS item is its price defined by a VENDOR for the part or an identical functional replacement. This price must be generally available to all *FIRST Robotics Competition* teams throughout the build and competition season (i.e. short-term sale prices or coupons do not reflect FMV), however teams are only expected to make a good faith effort at determining the item price and are not expected to monitor prices of ROBOT items throughout the season. The FMV is the cost of the item itself and does not include any duties, taxes, tariffs, shipping, or other costs that may vary by locality.

The FMV of COTS software is the price, set by the VENDOR, to license the software (or component of the software) that runs on the ROBOT for the period from Kickoff to the end of the *FIRST* Championship. The FMV of software licensed free-of-cost, including through the Virtual KOP, for use on the ROBOT is \$0.

The FMV of FABRICATED parts is the value of the material and/or labor, except for labor provided by team members (including sponsor employees who are members of the team), members of other teams, and/or event provided Machine Shops. Material costs are accounted for as the cost of any purchasable quantity that can be used to make the individual part (i.e. the purchasable raw material is larger than the FABRICATED part).

Example 1: A team orders a custom bracket made by a company to the team's specification. The company's material cost and normally charged labor rate apply.

Example 2: A team receives a donated sensor. The company would normally sell this item for \$450 USD, which is therefore its FMV.

Example 3: A team purchases titanium tube stock for \$400 USD and has it machined by a local machine shop. The machine shop is not considered a team Sponsor but donates two (2) hours of expended labor anyway. The team must include the estimated normal cost of the labor as if it were paid to the machine shop and add it to the \$400 USD.

Example 4: A team purchases titanium tube stock for \$400 USD and has it machined by a local machine shop that is a recognized Sponsor of the team. If the machinists are considered members of the team, their labor costs do not apply. The total applicable cost for the part would be \$400 USD.

It is in the best interests of the teams and *FIRST* to form relationships with as many organizations as possible. Teams are encouraged to be expansive in recruiting and including organizations in their team, as that exposes more people and organizations to *FIRST*. Recognizing supporting companies as Sponsors of, and members in, the team is encouraged, even if the involvement of the Sponsor is solely through the donation of fabrication labor.

Example 5: A team purchases titanium tube stock for \$400 USD and has it machined by another team. The total applicable cost for the part would be \$400 USD.

Example 6: A team purchases a widget at a garage sale or online auction for \$300, but it's available for sale from a VENDOR for \$700. The FMV is \$700.

If a COTS item is part of a modular system that can be assembled in several possible configurations, then each individual module must fit within the price constraints defined in R12.

If the modules are designed to assemble into a single configuration, and the assembly is functional in only that configuration, then the total cost of the complete assembly including all modules must fit within the price constraints defined in R12.

In summary, if a VENDOR sells a system or a kit, a team must use the entire system/kit Fair Market Value and not the value of its COMPONENT pieces.

Example 1: VENDOR A sells a gearbox that can be used with a number of different gear sets, and can mate with two different motors they sell. A team purchases the gearbox, a gear set, and a motor (which are not offered together as an assembly or kit), then assembles them together. Each part is treated separately for the purpose of BOM costing, since the purchased pieces can each be used in various configurations.

Example 2: VENDOR B sells a robotic arm assembly that the team wants to use. However, it costs \$700 USD, so they cannot use it. The VENDOR sells the "hand", "wrist", and "arm" as separate assemblies, for \$200 USD each. A team wishes to purchase the three items separately, then reassemble them. This would not be legal, as they are really buying and using the entire assembly, which has a Fair Market Value of \$700 USD.

Example 3: VENDOR C sells a set of wheels or wheel modules that are often used in groups of four. The wheels or modules can be used in other quantities or configurations. A team purchases four and uses them in the most common configuration. Each part is treated separately for the purpose of BOM costing, since the purchased pieces can be used in various

R13. This rule has been removed for the 2021 season.

R14. This rule has been removed for the 2021 season.

R15. This rule has been removed for the 2021 season.

R16. During an event a team is attending (regardless of whether the team is physically at the event location), the team may neither work on nor practice with their ROBOT or ROBOT elements outside of the hours that pits are open, with the following exceptions:

- A. OPERATOR CONSOLE,
- B. BUMPERS (a protective assembly designed to attach to the exterior of the ROBOT and constructed as specified in BUMPER Rules),
- C. battery assemblies as described in R5-B,

- D. FABRICATED ITEMS consisting of one COTS electrical device (e.g. a motor or motor controller) and attached COMPONENTS associated with any of the following modifications:
 - i. wires modified to facilitate connection to a ROBOT (including removal of existing connectors)
 - ii. connectors and any materials to secure and insulate those connectors added (Note: passive PCBs such as those used to adapt motor terminals to connectors are considered connectors)
 - iii. motor shafts modified and/or gears, pulleys, or sprockets added
 - iv. motors modified with a filtering capacitor as described in the Blue Box below R56
- E. COTS items with any of the following modifications:
 - i. Non-functional decoration or labeling
 - ii. Assembly of COTS items per manufacturer specs, unless the result constitutes a MAJOR MECHANISM as defined in I1
- F. Software development
- G. Batteries may be charged during the designated Load-in time

For the purposes of this rule, official events begin as follows: at the start of the first designated Load-in period, according to the Public Schedule. If the Public Schedule is not available or the Public Schedule does not include a Load-in period, the event begins at 6 AM local time.

- ~~Regionals, District Championships, and FIRST Championship: at the start of the first designated Load-in period, according to the Public Schedule. If the Public Schedule is not available or there is no designated Load-in period, the events begin at 4pm on the day prior to pits opening.~~
- ~~District Events: when pits open~~

Examples of activity prohibited by R16 include:

- a. Working on the ROBOT at the team's shop after Load-in for the event has begun
- b. Working on ROBOT parts at night at the team's hotel.

Note that E8 and E20 impose additional restrictions on work done on the ROBOT or ROBOT materials while attending an event.

One purpose of R16 is to increase equity between teams with significant travel to an event and those nearby (close teams would otherwise have an advantage by being able to work on their ROBOT, in their shop, until it's time to go to the event).

9.5 BUMPER Rules

R21. Each ROBOT must be able to display primarily Red or Blue BUMPERS to MATCH their ALLIANCE color, as assigned in the MATCH schedule distributed at the event (as described in [MATCH Schedules](#)). A BUMPER is considered primarily Red or Blue if all displayed BUMPER surfaces other than corners (i.e. everywhere the BUMPER is backed by the FRAME PERIMETER) displays the appropriate color. Any visible fabric other than the primary color must be a solid color. See Figure 9-4. BUMPER Markings visible when installed on the ROBOT, other than the following, are prohibited:

- A. those required per R22,
- B. hook-and-loop fastener or snap fasteners backed by the hard parts of the BUMPER, and
- C. solid white FIRST logos between 4¾ in. (~12 cm) and 5¼ in. wide (~13 cm) (i.e. comparable to those available in the [2020-2021 Virtual Kit](#)).

The FRAME PERIMETER facing surfaces and short perpendicular “ends” of BUMPERS are not “displayed” and thus R21 does not apply.

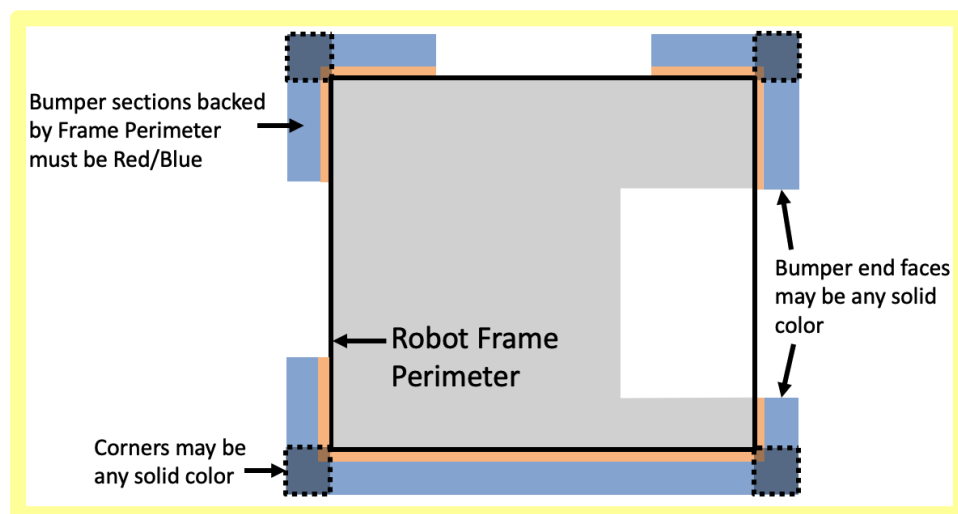


Figure 9-4 BUMPER color example

R24. BUMPERS must be constructed as follows (see Figure 9-7):

- A. ...
- B. ...
- C. ...
- D. be covered with a rugged, smooth cloth. (multiple layers of cloth and seams are permitted if needed to accommodate R21 and/or R22, provided the cross section in Figure 9-7 is not significantly altered).

Silk and bedding are not considered rugged cloths, however 1000D Cordura is. Tape (e.g. gaffer's tape) matching the BUMPER color is allowed to patch small holes on a temporary basis.

It is expected that there may be multiple layers of cloth as fabric is folded to accommodate the corners and seams of BUMPERS.

The cloth must completely enclose all exterior surfaces of the wood and pool noodle material when the BUMPER is installed on the ROBOT. The fabric covering the BUMPERS must be solid in color.

BUMPER corners and "ends", shown in Figure 9-4, must be solid in color, but do not need to be the same color as the rest of the BUMPER, as described in R21.

- E. ...
- F. ...
- G. ...

9.6 Motors & Actuators

R27. The only motors and actuators permitted on 2021 ROBOTS include the following (in any quantity):

Table 0-6 Motor allowances

Motor Name	Part Numbers Available	
AndyMark 9015	am-0912	AndyMark 9015
AndyMark NeveRest	am-3104	
AndyMark PG	am-2161 (alt. PN am-2765)	am-2194 (alt. PN am-2766)
AndyMark RedLine Motor	am-3775	am-3775a
AndyMark Snow Blower Motor	am-2235	am-2235a
Banebots	am-3830 M7-RS775-18 RS775WC-8514	M5 – RS550-12 RS550VC-7527 RS550
CIM	FR801-001 M4-R0062-12 AM802-001A 217-2000 PM25R-44F-1005	PM25R-45F-1004 PM25R-45F-1003 PMR25R-45F-1003 PMR25R-44F-1005 am-0255
CTR Electronics/VEX Robotics Falcon 500	217-6515 am-6515	19-708850 am-6515_Short
Current/former KOP Automotive motors	Denso AE235100-0160 Denso 5-163800-RC1 Denso 262100-3030	Denso 262100-3040 Bosch 6 004 RA3 194-06 Johnson Electric JE-PLG-149
Nidec Dynamo BLDC Motor	am-3740	DM3012-1063
Playing with Fusion Venom	BDC-10001	
REV Robotics HD Hex Motor	REV-41-1291	
REV Robotics NEO Brushless	REV-21-1650	
REV Robotics NEO 550	REV-21-1651	
VEX BAG	217-3351	
VEX Mini-CIM	217-3371	
West Coast Products RS775 Pro	217-4347	
Electrical solenoid actuators, no greater than 1 in. (nominal) stroke and rated electrical input power no greater than 10 watts (W) continuous duty at 12 volts (VDC)		
Fans, no greater than 120mm (nominal) size and rated electrical input power no greater than 10 watts (W) continuous duty at 12 volts (VDC)		
Hard drive motors part of a legal COTS computing device		
Factory installed vibration and autofocus motors resident in COTS computing devices (e.g. rumble motor in a smartphone).		
PWM COTS servos with a retail cost < \$75.		
Motors integral to a COTS sensor (e.g. LIDAR, scanning sonar, etc.), provided the device is not modified except to facilitate mounting		
One (1) compressor compliant with R79 and used to compress air for the ROBOT'S pneumatic system		

For servos, note that the roboRIO is limited to a max current output of 2.2A on the 6V rail (12.4W of electrical input power). Teams should make sure that their total servo power usage remains below this limit at all times.

Given the extensive amount of motors allowed on the ROBOT, teams are encouraged to consider the total power available from the ROBOT battery during the design and build of the ROBOT. Drawing large amounts of current from many motors at the same time could lead to drops in ROBOT battery voltage that may result in tripping the main breaker or trigger the brownout protection of the roboRIO. For more

information about the roboRIO brownout protection and measuring current draw using the PDP, see [roboRIO Brownout and Understanding Current Draw](#).

AndyMark PG Gearmotors are sold with labeling based on the entire assembly. Assemblies labeled am-3651 through am-3656 contain legal motors specified in the table above. These motors may be used with or without the provided gearbox.

9.10 OPERATOR CONSOLE

R88. The Driver Station software provided by [National Instruments \(install instructions found here\)](#) is the only application permitted to specify and communicate the operating mode (i.e. Autonomous/Teleoperated) and operating state (Enable/Disable) to the ROBOT. The Driver Station software must be revision 20-021.0 or newer.

Teams are permitted to use a portable computing device of their choice (laptop computer, tablet, etc.) to host the Driver Station software while participating in competition MATCHES.

Section 10 Inspection Rules Section

~~ROBOTS are permitted to participate in scheduled Practice MATCHES prior to passing Inspection. However, the FIRST Technical Advisor (FTA), LRI, or Head REFEREE may determine at any time that the ROBOT is unsafe, per [Safety Rules](#), and may prohibit further participation in Practice MATCHES until the condition is corrected and/or the ROBOT passes Inspection.~~

16. This rule has been removed for the 2021 season.

Section 11 Tournaments

Each 2021 FIRST® Robotics Competition event is played in a tournament format. Each tournament consists of ~~three~~ two sets of MATCHES called ~~Practice MATCHES (not necessarily played at all District Events)~~, Qualification MATCHES and Playoff MATCHES.

~~Practice MATCHES provide each team with an opportunity to operate its ROBOT on the FIELD prior to the start of the Qualification MATCHES.~~

Qualification MATCHES allow each team to earn Ranking Points which determine their seeding position and may qualify them for participation in the Playoff MATCHES.

Playoff MATCHES determine the event Champions.

11.2 REFEREE Interaction

If a DRIVE TEAM needs clarification on a ruling or score, per C9, one (1) pre-college student from that DRIVE TEAM should address the Head REFEREE after the ARENA Reset Signal (e.g. FIELD lights turn green **or green with white**). A DRIVE TEAM member signals their desire to speak with the Head REFEREE by standing in the corresponding Red or Blue Question Box, which are located on the floor near each end of the scoring table. Depending on timing, the Head REFEREE may postpone any requested discussion until the end of the subsequent MATCH as necessary.

11.2.1 Yellow and Red Cards

All YELLOW CARDS are cleared in FMS at the conclusion of Practice, Qualification, and Division Playoff MATCHES. The Head REFEREE may opt to perpetuate a YELLOW CARD earned during Practice MATCHES through to Qualification MATCHES for particularly egregious behavior.

11.4 Measurement

At each event, time permitting, the ARENA will be open for at least thirty (30) minutes prior to the start of Qualification MATCHES, during which time teams may survey and/or measure the ARENA and bring ROBOTS on the FIELD to perform sensor calibration. The specific time and duration that the FIELD is open will be communicated to teams at the event. Teams may bring specific questions or comments to the FTA.

11.5 Practice MATCHES

Information about Practice MATCHES has been removed since One Day Events will not include them. This section will be populated if/when appropriate for the 2021 season, via a Team Update. For more information, see the [FIRST Inspire Blog](#), specifically “[Update: 2020-2021 FIRST Season Extended](#).”

11.6 Qualification MATCHES

11.6.1 Schedule

The Qualification MATCH schedule is made available as soon as possible, but no later than one hour thirty (30) minutes before Qualification MATCHES are scheduled to begin. Teams receive one (1) hard copy and it is also available at the [FIRST Robotics Event Results site](#), except during exceptional circumstances. Each Qualification schedule consists of a series of rounds in which each team plays one (1) MATCH per round.

11.6.2 MATCH Assignment

FMS assigns each team two (2) ALLIANCE partners for each Qualification MATCH using a predefined algorithm, and teams may not switch Qualification MATCH assignments. The algorithm employs the following criteria at events with 24 or more teams, listed in order of priority:

1. maximize time between each MATCH played for all teams
2. minimize the number of times a team plays opposite any team
3. minimize the number of times a team is allied with any team
4. minimize the use of SURROGATES (teams randomly assigned by the FMS to play an extra Qualification MATCH)
5. provide even distribution of MATCHES played on Blue and Red ALLIANCE
6. provide even distribution of MATCHES played in each PLAYER STATION number.

At events with fewer than 24 participating teams, the criteria are similar, however criterion #5 is changed to minimize the number of times a team swaps between the Blue and Red ALLIANCE rather than an even distribution.

All teams are assigned the same number of Qualification MATCHES, equal to the number of rounds, unless the number of teams multiplied by number of MATCHES is not divisible by six. In this case, the FMS randomly selects some teams to play an extra MATCH. For the purpose of seeding calculations, those teams are designated as SURROGATES for the extra MATCH. If a team plays a MATCH as a SURROGATE, it is indicated on the MATCH schedule, it is always their third Qualification MATCH, and the outcome of the MATCH has no effect on the team's ranking. YELLOW and RED CARDS assigned to SURROGATES, however, do carry forward to subsequent MATCHES.

The scheduling algorithm works to minimize teams playing in back-to-back MATCHES. However, due to the limited number of teams permitted in the One Day Event structure for the 2021 season, back-to-back plays may occur. If any

team is scheduled to play in back-to-back MATCHES, the Head REFEREE will issue a FIELD TIMEOUT unless a longer break is already scheduled to occur (e.g. lunch.) See TIMEOUTS for details.

11. 7 Playoff MATCHES

In the case where the Quarterfinal or Semifinal MATCH scores for both ALLIANCES are equal, the Win is awarded to the ALLIANCE per criteria listed in Table 11-3. A DISQUALIFIED team, as determined by the Head REFEREE, causes their ALLIANCE to receive zero (0) MATCH points in a Playoff MATCH.

11.7.1 ALLIANCE Selection Process

- All references to eight (8) ALLIANCES being formed have been changed to four (4) ALLIANCES.
- Playoff MATCH Bracket has been updated.
- Playoff order has been updated.

Each team chooses a student team representative who proceeds to the ARENA at the designated time (typically before the lunch break on the final day of the event) to represent their team. The designated student representative from each ALLIANCE in a Playoff MATCH is called the ALLIANCE CAPTAIN.

11.7.2 ALLIANCE Selection Process

- All references to Quarterfinals have been removed and/or changed to Semifinals.

11.7.4 TIMEOUTS

This section has been moved to 11.8 and has been updated for One Day Events.

11.8 TIMEOUTS

A TIMEOUT is a period of up to six (6) minutes between MATCHES which is used to pause Qualification or Playoff MATCH progression. If circumstances require any team to play in back-to-back MATCHES, the Head REFEREE will issue a FIELD TIMEOUT to allow teams to prepare for the next MATCH. FIELD TIMEOUTS are the same time duration as TIMEOUTS.

During a TIMEOUT, the ARENA Timer displays the time remaining in the TIMEOUT. Both ALLIANCES enjoy the complete six (6) minute window. During Qualification MATCHES, if the ROBOT(S) who are playing in back-to-back MATCHES completes their repairs before the ARENA Time expires, the team(s) are encouraged to inform the Head REFEREE that they are ready to play. During Playoff MATCHES, if an ALLIANCE completes their repairs before the ARENA Timer expires, the ALLIANCE CAPTAIN is encouraged to inform the Head REFEREE that they are ready to play. If both all ROBOTS/ALLIANCES are ready to play before the TIMEOUT expires, the next MATCH will start.

~~There are no TIMEOUTS for Practice or Qualification MATCHES.~~

~~If circumstances require an ALLIANCE to play in back-to-back MATCHES during the Playoff MATCHES, the Head REFEREE will issue a FIELD TIMEOUT to allow teams to prepare for the next MATCH. FIELD TIMEOUTS are the same time duration as TIMEOUTS.~~

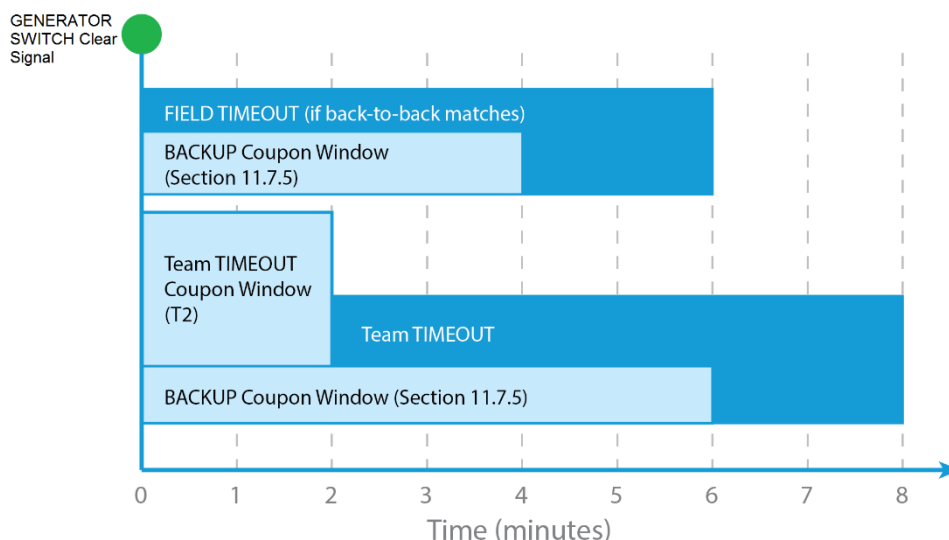


Figure 0-4 TIMEOUT and BACKUP Coupon Timeline

The GENERATOR SWITCH Clear Signal is indicated to teams with a change in the POWER PORT lights from green with white to fully green, as seen in Table 3-2 and Figure 3-19. FIELD STAFF will manually trigger the GENERATOR SWITCH Clear Signal after all ROBOTS have been removed from their GENERATOR SWITCH.

Each ALLIANCE in the Playoff tournament is issued (1) TIMEOUT.

Teams are expected to have their ROBOTS staged on the FIELD by the end of the TIMEOUT. Teams that cause a delay to the start of a MATCH after a TIMEOUT are at risk of being in violation of C7.

11.8.1 TIMEOUTS in Playoff MATCHES

Each ALLIANCE in the Playoff tournament is issued (1) TIMEOUT.

- T3.** If an ALLIANCE wishes to use their TIMEOUT, the ALLIANCE CAPTAIN must submit their TIMEOUT coupon to the Head REFEREE within two (2) minutes of the GENERATOR SWITCH Clear signal preceding their MATCH. If there is no preceding MATCH, the TIMEOUT coupon must be submitted no later than two (2) minutes before the scheduled MATCH time. The TIMEOUT will begin two (2) minutes after the GENERATOR SWITCH Clear signal (i.e. at the end of the Team TIMEOUT Coupon Window depicted in Figure 0-4)

A request presented outside the defined parameters in T2 will be denied.

There are no cascading TIMEOUTS. If an ALLIANCE calls a TIMEOUT during a FIELD TIMEOUT, the FIELD TIMEOUT will expire two (2) minutes after the GENERATOR SWITCH Clear signal and the ALLIANCE'S TIMEOUT will begin.

If an ALLIANCE wishes to call a TIMEOUT during a FIELD TIMEOUT, it must still do so within two (2) minutes of the GENERATOR SWITCH Clear signal preceding their MATCH, per 0.

TIMEOUTS are not transferrable between ALLIANCES, meaning an ALLIANCE cannot hand their designated TIMEOUT coupon to another ALLIANCE to use, however an ALLIANCE may use their own coupon for any purpose they wish.

If a Playoff MATCH is replayed because of an ARENA FAULT which rendered a ROBOT inoperable, the Head REFEREE has the option of calling a FIELD TIMEOUT.

11.9 Advancement Through the District Model

Information about advancement through the District Model has been removed. This section will be populated if/when appropriate for the 2021 season, via a Team Update. For more information, see the [FIRST Inspire Blog](#), specifically "[Update: 2020-2021 FIRST Season Extended](#)."

11.10 Advancement to the *FIRST*® Championship

Information about advancement to the *FIRST* Championship has been removed. This section will be populated if/when appropriate for the 2021 season, via a Team Update. For more information, see the [FIRST Inspire Blog](#), specifically "[Update: 2020-2021 FIRST Season Extended](#)."

11.11 *FIRST*® Championship: Additions and Exceptions

Information about additions and exceptions for the 2021 *FIRST* Championship events has been removed. This section will be populated if/when appropriate for the 2021 season, via a Team Update. For more information, see the [FIRST Inspire Blog](#), specifically "[Update: 2020-2021 FIRST Season Extended](#)."

Section 12 Glossary

The Glossary has been updated. Terms that are no longer referenced in the Game Manual have been removed.