

Team Update 00

The [FIRST® Robotics Competition Game Manual](#) has undergone significant reorganization and modification since the 2023 season. Because of the degree of the changes, red-line coverage of the changes would be extensive and difficult to parse. As a result, the approach taken in this *Team Update 00* is to describe changes to content only. Editorial changes to verbiage (e.g. improving explanation language like in the blue box for G419), rule and section references, game specific examples that relate to evergreen content, and formatting changes are not described.

As always, it's important to read the whole manual at least once and become an expert on sections of the manual that directly relate to your role and responsibilities on your team. As always, you're welcome to ask (thoughtful, informed) questions through the [official Q&A system](#), opening at noon (Eastern time) on Wednesday, January 10, 2023.

Organizational Changes

Changes that relate to the layout and order of the document's contents are described in the list below:

- Some content formerly presented as a rule is now presented as a process description or in a list of prerequisites. For example, the requirement that DRIVE TEAMS in the ALLIANCE AREA start behind the STARTING LINE is now presented in a list of requirements for a MATCH to being instead of as a rule with a violation imposed if broken.
- Some rules are combined.
- Some rules or parts of rules are broken up and distributed to other rules, process descriptions, or stand alone.
- The Event Manual is incorporated into the end of the document.

Content Changes

Changes to evergreen content (i.e. rules with green headlines) are described below. Sections are presented according to the 2024 manual presentation, and rule references present the 2023 rule number first followed by the 2024 rule number.

Section 7 Game Rules

- **G103** ⇒ **G412**, *Keep your BUMPERS low.*

Because the reference to REPEATED and greater than MOMENTARY violations of the BUMPER ZONE is in G411, the violation omits

If REPEATED or greater than MOMENTARY, DISABLED

- **G202** ⇒ **G420**, *There's a 5-count on PINS.*

The description of the procedural PIN count and PIN count suspension is promoted from the Blue Box to the rule itself.

-
- **G204 ⇒ G417, Stay out of other ROBOTS.**

The reference to contact within a BUMPER opening is omitted.

- **G205 ⇒ G418, This isn't combat robotics.**

Part B omits

Contact between the ROBOT'S BUMPERS or COMPONENTS inside the ROBOT'S FRAME PERIMETER and COMPONENTS inside an opening of an opponent's BUMPERS or in the space above the BUMPER opening are exceptions to this rule.

- **G401 ⇒ G407, Keep NOTES in bounds.**

The violation changed from

FOUL

to

TECH FOUL

- **H101 ⇒ G201, Be a good person.**

Violation language changed from

Behavior will be discussed with team or individual. Violations of this rule are likely to escalate to YELLOW or RED CARDS rapidly (i.e. the threshold for egregious violations is relatively low.)

to

Verbal warning, plus YELLOW CARD if subsequent violations during the event.

- **H102 ⇒ G209, Enter only 1 ROBOT.**

Violation language changed from

Verbal warning. Egregious or subsequent violations at any point during the event will be addressed by the Head REFEREE, the Lead ROBOT INSPECTOR (LRI), and/or Event Management.

to

Verbal warning.

- **H105 ⇒ G203, Asking other teams to throw a MATCH – not cool.**

H106 ⇒ G204, Letting someone coerce you into throwing a MATCH – also not cool.

H107 ⇒ G205, Throwing your own MATCH is bad.

Violation language changed from

Behavior will be discussed with team or individual. Violations of this rule are likely to escalate rapidly to YELLOW or RED CARDS and may lead to dismissal from the event (i.e. the threshold for egregious violations is relatively low.)

to

Verbal warning, plus YELLOW CARD if subsequent violations during the event.

- **H109 ⇒ G103, Be careful what you interact with.**

Rule language omits

Temporary deformation of a GAME PIECE (e.g. to pre-load a ROBOT) is an exception to this rule.

Item A omits

(unless instructed by FIELD staff)

Item C was changed from

deforming

to

manipulating such that it doesn't return to its original shape without human intervention.

- **H202 ⇒ Q101, 1 STUDENT, 1 Head REFEREE.**

The blue box language incorporates language related to recording conversations published in [2023 Team Update 21](#).

- **H302 ⇒ G104, Teams may not enable their ROBOTS on the FIELD.**

Violation language changed from

YELLOW CARD

to

Verbal warning, plus YELLOW CARD if subsequent violations during the event.

- **H305 ⇒ G208, Show up to your MATCHES.**

Violation language changed from

RED CARD

to

DISQUALIFIED

Image 7-1 reflects the change described above and removes the reference to an uninspected team competing in Playoff MATCHES.

-
- **H501** ⇒ **G426**: **COACHES** and other teams: hands off the controls.

Violation language changed from

DISABLED

to

TECH FOUL, plus RED CARD if greater-than-MOMENTARY.

- **H503** ⇒ **n/a**, **COACHES**, **GAME PIECES** are off limits.

Removed

Section 8 ROBOT Construction Rules

- **R203** ⇒ **R203**, **General safety**.

Blue Box item C changes vision target reference to 36h11 AprilTags.

- **R401** ⇒ **R401**, **BUMPERS** all around.

Headline changed from

BUMPERS should protect all corners.

to

BUMPERS all around.

Rule language updated to require BUMPERS around the full FRAME PERIMETER.

- **R406** ⇒ **R406**, **Team number on BUMPERS**.

Rule language listing requirements for team number visibility adds

from as far as approximately 60 ft. (1829 mm)

and new item C states that team numbers

must not split individual digits by more than 2 in. (~5 cm),

- **R408** ⇒ **R408**, **BUMPER construction**.

The Blue Box below item C changes lower limit of measured pool noodle diameter from

2¼ in. (~57 mm)

to

2⅝ in. (~54 mm).

The Blue Box below item D adds

Non-woven materials such as leather or pleather are not considered cloth.

- **R501** ⇒ **R501**, **Allowable motors**.

Table 8-1 includes the West Coast Products' Kraken x60 and the REV Robotics NEO Vortex and their respective available part numbers. (along with Table 8-2 updated accordingly).

The language describing permitted electric solenoid actuators is changed from

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)

to

Electrical solenoid actuators or electromagnets with rated electrical input power no greater than 50 watts (W) continuous duty at 12 volts (VDC)

- **n/a** ⇒ **R502**, Only 4 propulsion motors.

Added, and additional context is available in [this August 2022 blog](#).

- **R503** ⇒ **R504**, Power (most) actuators off of approved devices.

Item A adds subitem e

Spark Flex Motor Controller (P/N REV-11-2159, am-5276)

Item A, subitem h adds alternate part number for the Talon FX Motor Controller

WCP-0940

- **R602** ⇒ **R602**, Other batteries for cameras or computers only.

The battery pack max output per port is increased from

2.5 Amps

to

5 Amps

and rule language listing permitted batteries adds

or coin cell batteries used to power CMOS/RTC features

- **R604** ⇒ **R604**, Charge batteries at a safe rate.

The type of charge current limit changes from

peak

to

average

- **R621** ⇒ **R621**, Protect circuits with appropriate circuit breakers.

Rule language adds

...with the exception of devices downstream of a Kraken X60 Powerpole adapter board (WCP-1380).

- **R622** ⇒ **R622**, Use appropriately sized wire.

Table 8-4 adds

Kraken X60 Powerpole Adapter protected circuit

- Section 8.8 Pneumatic System includes comparable Bar units for pressure measurements.
- **R808** ⇒ **R808**, Working air pressure limit.

Rule language adds

Additional regulators may be located downstream of the single primary regulator.

- **R810** ⇒ **R810**, Pressure gauges must be visible.

The list of approved units for displaying pressure adds

Bar

- **R814** ⇒ **R814**, Don't connect solenoid outputs together.

Rule language changes from

The outputs from multiple solenoid valves must not be plumbed together.

to

The output air from multiple solenoid valves must not be combined.

A new Blue Box states

Manifolds, shuttle valves, and other devices which do not combine output airflow, even though it may be plumbed into the same device, are not violations of this rule.

- **R901** ⇒ **R901**, Use the specified Driver Station Software.

Changes Driver Station Software version requirement from

23

to

24.1

Section 9 Inspection & Eligibility

Introductory language adds

A safe ROBOT has functional BUMPERS that approximately meet the required coverage (R401), height (R402), and cross section (R408) requirements.

Section 10 Tournaments

- Section 10.2 MATCH Replays adds item G

a ROBOT radio disconnect that impairs operation of other ROBOTS on the FIELD for more than 8 seconds.

The following Blue Box adds item E

scenario G occurring before the last 20 seconds of the MATCH.

- Section 10.6.2 Playoff MATCH Bracket, Table 10-2 is updated per [this August blog post](#).
The new table
 - increases the cycle time to 9 minutes,
 - removes the break between rounds 1 and 2,
 - removes the break between rounds 2 and 3,
 - decreases the break length between rounds 3 and 4 to 6 minutes,
 - specifies which awards are presented in which breaks.

Section 13 Event Rules

- **E115, E117, E605, and E606** are new.
- **E301, No wireless communication.**

The prohibited wireless network list changed from

802.11a/b/g/n/ac/ax (2.4GHz or 5GHz)

to

802.11a/b/g/n/ac/ax/be