VEX ROBOTICS COMPETITION

TIPPING POINT

2021 - 2022
Appendix B - Skills Challenge

Appendix B
Robot Skills Challenge

Overview

This Appendix describes the Robot Skills Challenge rules for VEX Robotics Competition Tipping Point.

Please note that the Robot Skills Challenge may not be offered at all tournaments. Please check with your local Event Partner or www.robotevents.com for more information.

Robot Skills Challenge Description

In this challenge, *Teams* will compete in sixty second (1:00) long *Matches* in an effort to score as many points as possible. These *Matches* consist of *Driving Skills Matches*, which will be entirely driver controlled, and *Programming Skills Matches*, which will be autonomous with limited human interaction. *Teams* will be ranked based on their combined score in the two types of *Matches*.

The Robot Skills Challenge playing field is set up almost exactly the same as a normal VEX Robotics Competition Tipping Point *Match*, with the following modifications

- The positions of red and blue *Alliance Mobile Goals* are reversed, i.e. the red *Alliance Mobile Goals* begin the *Match* in the blue *Alliance Home Zone*, and vice versa.
- In *Programming Skills Matches*, the VEX GPS code strip must be installed on the field. This field modification will be recommended for all events beginning August 1, and required for all events beginning October 1.

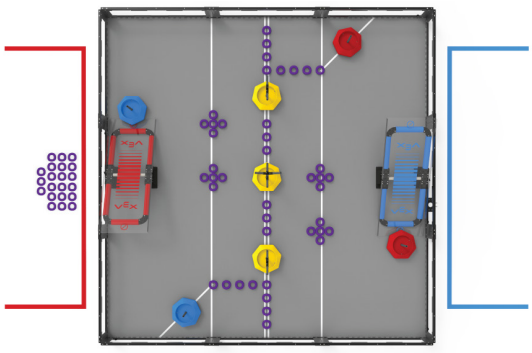

Figure 1: View of the Robot Skills Challenge field in its initial setup configuration.

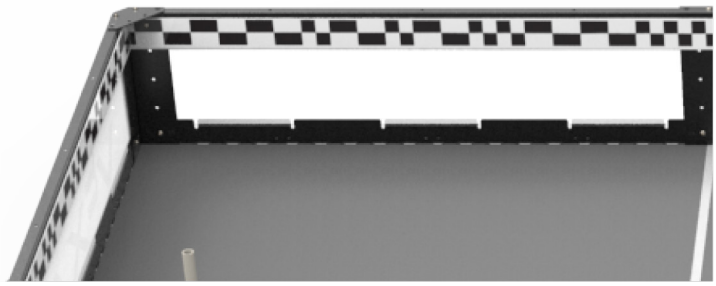

Figure 2: GPS Field Code strips must be installed on the field for Programming Skills Matches.

Robot Skills Challenge Definitions

Please note that all definitions from "The Game" section of the manual apply to the Robot Skills Challenge, unless otherwise specified.

Driving Skills Match – A *Driving Skills Match* consists of a sixty second (1:00) *Driver Controlled Period*. There is no *Autonomous Period*. *Teams* can elect to end their run early, however this will count as an official run.

Programming Skills Match – A *Programming Skills Match* consists of a sixty second (1:00) *Autonomous Period*. There is no *Driver Controlled Period*. *Teams* can elect to end their run early, however this will count as an official run.

Robot Skills Match – A *Driving Skills Match* or *Programming Skills Match*.

Skills Stop Time – The time remaining in a *Robot Skills Match* when a *Team* ends the *Match* early. If a *Team* does not end the *Match* early, they receive a default *Skills Stop Time* of 0.

a. The moment when the *Match* ends early is defined as the moment when the *Robot* is "disabled" by the field control system. See the "Skills Stop Time" section for more details.
b. If a V5 Robot Brain or Tournament Manager display is being used for field control, then the *Skills Stop Time* is the time shown on the display when the *Match* is ended early (i.e. in 1-second increments).
c. If a VEXnet Competition Switch is being used for field control, in conjunction with a manual timer that counts down to 0 with greater accuracy than 1-second increments, then the time shown on the timer should be rounded up to the nearest second.
    i. For example, if the *Robot* is disabled and the timer shows 25.2 seconds, then the *Skills Stop Time* should be recorded as 26.

Robot Skills Challenge Rules

Please note that all rules from "The Game" section of the manual apply to the Robot Skills Challenge, unless otherwise specified.

<RSC1> *Robots* may start the *Robot Skills Match* per <SG1> in either *Alliance Home Zone* with all *Drive Team Members* standing in the corresponding *Alliance Station*.

a. *Teams* must still utilize their three (3) *Preload* Rings as specified in rule <SG1>.
    i. The nine (9) *Rings* that would be used as *Preloads* by the other *Teams* in the *Match* are not used in the Robot Skills Challenge.
b. *Teams* may utilize eighteen (18) *Match Load Rings*, within the guidelines set forth by <SG8>.
    i. All *Match Load Rings* begin the *Match* in the *Alliance Station* where the *Drive Team Members* are standing. *Match Load Rings* may not be introduced from the *Alliance Station* that is not being used.

<RSC2> In *Robot Skills Matches*, *Teams* play if they are on a "neutral" *Alliance*. *Robots* may freely manipulate *Alliance Mobile Goals*, *Neutral Mobile Goals*, and utilize either *Platform*. Therefore, the following "Alliance-specific" rules do not apply in *Robot Skills Matches*:

- <SG3>
- <SG4>
- <SG6>
- <SG7>

Robot Skills Challenge Scoring

Points are awarded according to the same scoring rules as standard VEX Robotics Competition Tipping Point head-to-head *Matches*. A *Team's* score at the end of a *Robot Skills Match* is calculated by combining the scores that would have been awarded to the red and blue *Alliances*. For example:

- A red *Alliance Mobile Goal* that ends the *Match* in the red *Alliance Home Zone* is worth twenty (20) points, plus the associated points for any *Rings* which are *Scored* on / in it.
- A blue *Alliance Mobile Goal* that ends the *Match* in the red *Alliance Home Zone*, is not worth any points. However, it would still receive the points for any *Rings* which are *Scored* on / in it.
- *Neutral Mobile Goals*, and any *Rings* scored on / in them can be *Scored* in either *Alliance Home Zone*.
- A *Robot* which is *Elevated* on either *Platform* is worth thirty (30) points.

Skills Stop Time

If a *Team* wishes to end their *Robot Skills Match* early, they may elect to record a *Skills Stop Time*. This may be used as a tiebreaker for *Robot Skills Challenge* rankings. A *Skills Stop Time* does not affect a *Team's* score for a given *Robot Skills Match*.

- *Teams* who intend to attempt a *Skills Stop Time* must "opt-in" by verbally confirming with the scorekeeper referee prior to the *Robot Skills Match*. If no notification is given prior to the start of the *Match*, then the *Team* forfeits their option for recording a *Skills Stop Time*.
  - This conversation should include informing the scorekeeper referee which *Drive Team Member* will be signaling the stop. The *Match* may only be ended early by a *Drive Team Member* standing in the *Alliance Station*.
  - If a *Team* is running multiple *Robot Skills Matches* in a row, they must reconfirm their *Skills Stop Time* choice with the scorekeeper referee prior to each *Match*.
  - Any questions regarding a *Skills Stop Time* should be reviewed and settled immediately following the Match. <T1> and <T2> apply to *Robot Skills Matches*.

- If the event is utilizing a V5 Robot Brain or the TM Mobile app for *Robot Skills Challenge* field control, a *Drive Team Member* may elect to start and stop their own *Robot Skills Match*.
  - This V5 Robot Brain, or device running the TM Mobile app, will be used to start the *Robot Skills Match* (i.e. "enable" the *Robot*), end the *Robot Skills Match* (i.e. "disable" the *Robot*), and display the official *Skills Stop Time* to be recorded.
  - This V5 Robot Brain must be running the official field control user program.
  - For more information regarding the use of a V5 Robot Brain for Robot Skills Challenge field control, and to download the official field control user program, visit this VEX Knowledge Base article.

- For more information regarding the use of TM Mobile for field control, see the Tournament Manager documentation.

- At events which do not have a V5 Robot Brain or TM Mobile available for Robot Skills Challenge field control, *Drive Team Members* and field staff must agree prior to the *Match* on the signal that will be used to end the *Match* early.
  - As noted in the definition of *Skills Stop Time*, the moment when the *Match* ends early is defined as the moment when the *Robot* is "disabled" by the field control system.
  - The agreed-upon signal must be both verbal and visual, such as *Drive Team Members* crossing their arms in an "X", or placing their V5 Controller(s) on the ground.
  - The signal must be given by a *Drive Team Member* standing in the *Alliance Station*.
  - *Drive Team Members* are also recommended to provide verbal notice that they are approaching their *Skills Stop Times*, such as by counting out "3-2-1-stop".

- It is at the *Event Partner's* discretion which method will be used to record *Skills Stop Times* at a given event. The chosen method must be communicated prior to the event (such as during a drivers' meeting), and made equally available to all *Teams*.
  - If an event intends to use a manual timekeeping method, a *Team* may not bring their own V5 Robot Brain just for use during their own *Robot Skills Match*.
  - If an event intends to utilize a V5 Robot Brain, all *Teams* must use the same V5 Robot Brain for all *Robot Skills Matches* on a given field.
  - If an event is using multiple fields for *Robot Skills Matches*, the same method must be used at all fields. Multiple V5 Robot Brains may be used as needed, e.g. a "Field 1 Brain" and a "Field 2 Brain".
  - The default "Drive" program accessed from a V5 Controller is intended for practice only, and may not be used for an official *Robot Skills Match*.

Robot Skills Challenge Ranking at Events

For each *Robot Skills Match*, *Teams* are awarded a score as described in the Robot Skills Challenge Scoring section, and a *Skills Stop Time* as described in the Skills Stop Time section. *Teams* will be ranked based on the following tiebreakers:

1. Sum of highest *Programming Skills Match* score and highest *Driving Skills Match* score.
2. Highest *Programming Skills Match* score.
3. Second-highest *Programming Skills Match* score.
4. Second-highest *Driving Skills Match* score.
5. Highest sum of *Skills Stop Times* from a *Team's* highest *Programming Skills Match* and highest *Driving Skills Match* (i.e. the *Matches* in point 1).
6. Highest *Skills Stop Time* from a *Team's* highest *Programming Skills Match* (i.e. the *Match* in point 2).
7. Third-highest *Programming Skills Match* score.
8. Third-highest *Driving Skills Match* score.

- If a tie cannot be broken after all above criteria, then the following ordered criteria will be used to determine which *Team* had the "best" *Programming Skills Match*:

1. Number of *Elevated Mobile Goals*.
2. Number of *Scored Mobile Goals*.
3. Number of *Scored Rings*
4. Number of *Elevated Robots*

- If the tie still cannot be broken, the same process in the step above will be applied to the *Teams*' best *Driving Skills Match*.

- If the tie still isn't broken, events may choose to allow *Teams* to have one more deciding *Driving Skills Match*, to be ranked according to the standard criteria above, or declare both *Teams* the Robot Skills Challenge Winner.

Robot Skills Challenge Ranking Globally

Teams will be ranked Globally based on their Robot Skills scores from Tournaments and Leagues that upload results to robotevents.com according to the following tiebreakers.

1. Highest Robot Skills score (combined *Programming Skills Match* and *Driving Skills Match* Score from a single event).
2. Highest *Programming Skills Match* score (from any event).
3. Highest sum of *Skills Stop Times* from the *Robot Skills Matches* used for point 1.
4. Highest *Skills Stop Time* from the *Programming Skills Match* used for point 2.
5. Highest *Driving Skills Match* score (from any event).
6. Highest *Skills Stop Time* from the *Driving Skills Match* score used for point 5.
7. Earliest posting of the Highest *Programming Skills Match* score.
   a. The first *Team* to post a score ranks ahead of other *Teams* that post the same score at a later time, all else being equal.
8. Earliest posting of the Highest *Driving Skills Match* score.
   a. The first *Team* to post a score ranks ahead of other *Teams* that post the same score at a later time, all else being equal.

Robot Skills Challenge Format Options

To better accommodate varying health & safety circumstances in different regions, the 2021-2022 season will feature different avenues for *Event Partners* to host Robot Skills Challenge competitions. Regardless of the format chosen for a given event, all rules, scoring, and rankings listed in this Appendix apply. However, some formats will have additional rules in place to ensure fair and consistent gameplay.

Robot Skills Challenge at a Standard Qualifying Tournament

The Robot Skills Challenge is an optional event. *Teams* who do not compete will not be penalized in the main tournament.

- *Teams* may play *Robot Skills Matches* on a "first come, first serve" basis, or by a pre-scheduled method determined by the *Event Partner*.

- *Teams* will be given the opportunity to play exactly three (3) *Programming Skills Matches* and three (3) *Driving Skills Matches*. *Teams* should be aware of when the Robot Skills fields are open so that they do not miss their opportunity. For example, if a *Team* waits until five minutes before the Robot Skills fields close, then they have not used the opportunity given to them and will not be able to compete in all six matches.

Skills-Only Event: In-Person, Live

- *Teams* may play *Robot Skills Matches* on a "first come, first serve" basis, or by a pre-scheduled method determined by the *Event Partner*.
- Further details regarding Skills-Only Event logistics can be found in the REC Foundation Qualification Criteria document.