



2020 - 2021
Appendix B - Skills Challenge

Appendix B

Robot Skills Challenge

Overview

This Appendix describes the combined Robot Skills Challenge rules for VEX Robotics Competition Change Up.

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 a *Match* lasting a maximum of sixty seconds (1:00) 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 no human interaction. *Teams* will be ranked based on their combined score in the two types of *Matches*.

The playing field will have *Field Elements* setup exactly the same as a normal VEX Robotics Competition Change Up Match, however, the *Balls* will start as displayed below.

Note: Only (15) of each colored *Ball* is used in a *Robot Skills Match*.

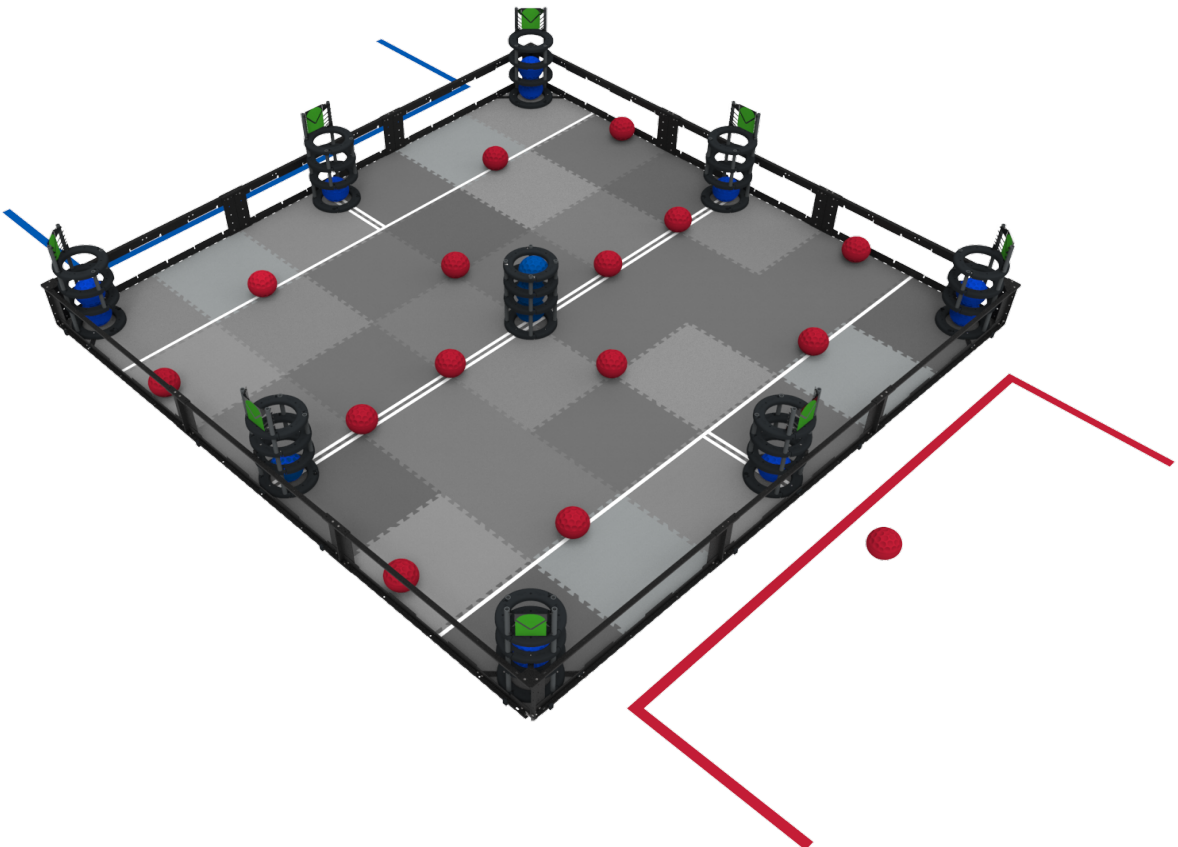


Figure 1: Side view of the Robot Skills Challenge field in its initial setup configuration.

Game 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*.

Programming Skills Match – A *Programming Skills Match* consists of a sixty second (1:00) *Autonomous Period*. There is no *Driver Controlled Period*.

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 stopwatch 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 *Home Zone* with the *Drive Team Members* standing in the *Alliance Station* that corresponds with that *Home Zone*.

Note: The other three (3) *Preloads* are not used in a *Robot Skills Match*.

<RSC2> In *Robot Skills Matches*, *Teams* play as if they are on the red *Alliance* Scoring only red *Balls* and Owning only red *Goals*.

<RSC3> Rules <SG2> and <SG3> do not apply in *Programming Skills Matches*.

Robot Skills Challenge Scoring

Teams receive points according to the same Scoring rules in VEX Robotics Competition Change Up when Scoring for the red *Alliance*.

Additionally, *Teams* receive points for any blue *Balls* that are removed from their starting positions in *Goals*. These points are equal to how many points would have been "de-scored" from the blue *Alliance* by removing that *Ball*.

To calculate this, all *Balls* will be scored at the end of a *Robot Skills Match*s for their respective *Alliances*, with the same scoring rules as a standard VRC Change Up *Match*. The *Team's Robot Skills Match* score will then be calculated as follows:

$$(\text{Red Alliance Score}) - (\text{Blue Alliance Score}) + 63$$

One intent of this scoring method is to simulate a standard VRC Change Up Match that has already begun. The *Team* represents a member of the red *Alliance*, competing against a blue *Alliance* who has scored all of their *Balls*. The final score can be interpreted as how far the red *Robot* has been able to overcome this deficit in their 60-second *Robot Skills Match*.

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 Match*s 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 Match*s.
- If the event is utilizing a V5 Robot Brain or 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) / VEXnet Joystick(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 *Connected Rows*.
 2. Number of *Scored Balls*.

- 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

- 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, e.g. 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.