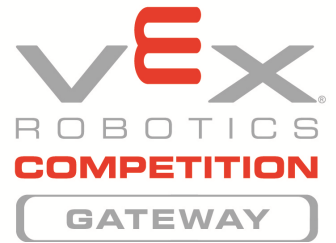# Robot Inspection Guidelines

APPENDIX D

Overview

This section describes the Robot Inspection process used at VEX Robotics Competition Tournaments. It also lists the inspection definitions and inspection rules.

Description

Every *robot* will be required to pass a full inspection before being cleared to compete. This inspection will ensure that all *robot* rules and regulations are met. Initial inspections will typically take place during team registration/practice time. Every team should use the "Robot Inspection Checklist" as a guide to pre-inspect their *robot* and ensure that it meets all requirements.

Teams are responsible for ensuring their robot has the latest version of the VEX Master Code installed and has their software updated. Robots are not allowed to receive any feedback from Human Operators during the Autonomous Period. During this time robots must operate and react only to sensor inputs and to pre-programmed commands. Teams are responsible for programming their robot with custom software if they want to perform during the Autonomous Period.

For more information on preparing a robot for Autonomous Operation teams should consult the help guides provided by the developers of their chosen programming software (ex. EasyC, ROBOTC, etc).

Definitions

Robot – An operator controlled and/or autonomous programmed vehicle designed and built by a VEX Robotics Competition team to perform specific tasks while competing. The robot can be constructed using only "Official VEX" components and additional components approved for the competition. No other parts will be allowed on the robot. Prior to participating in the competition, each *robot* will be required to pass an inspection. Additional inspections may be required at the discretion of event personnel.

Robot Sizing Device – A box or template used during *robot* inspection. If a box is used, it has interior dimensions 18 inches (45.72cm) wide by 18 inches (45.72cm) long by 18 inches (45.72cm) high. The *robot* must fit within the box without touching the box sides or top. Alternately, Inspectors may use the VRC Robot Sizing Tool (http://www.vexrobotics.com/products/competition-products/275-1455.html). The robot is placed on an 18"x18" platform and a measurement slide is passed along both sides to check for conformance.

Robot Identification Flag – A flag mounted on the *robot* used to identify the alliance of the robot during the match. The flag color is either red or blue.

Inspection Rules ▪▫▪▫▪▫▪▫▪▫▪▫▪▫▪▫▪▫▪▫▪▫▪▫

<I01> The team's *robot* must pass inspection before being allowed to compete in Qualification Rounds. Noncompliance with any *robot* design or construction rule may result in disqualification of the robot at an event.

<I02> Each *robot* must display the appropriate identification features as mandated by the tournament.

<I03> *Robot* construction is constrained by the number of Official VEX Components a team may use as defined in the Robot section of the manual.

<I04> The maximum size of the *robot* for starting a Qualifying or Elimination Match is 18 inches (45.72cm) wide by 18 inches (45.72cm) long by 18 inches (45.72cm) high. The *robot* must fit within a *Robot Sizing Device* without touching the sides or top of the *Robot Sizing Device.* The *robot* must be self-supporting while in the *Robot Sizing Device*.
   a. If a *Robot Sizing Device* is not available, some other measuring device may be used. Measuring devices or templates need to be capable of verifying that the *robot* does not exceed the starting size limitation.

<I05> The starting configuration of the *robot* at the beginning of a match must be the same as a *robot* configuration inspected for compliance, and within the maximum allowed size.
   a. Teams using more than one *robot* configuration at the beginning of matches must tell the inspector(s) and have the *robot* inspected in its largest configuration(s).
   b. A team may NOT have their *robot* inspected in one configuration and then place it at the start of a match in an uninspected configuration.

<I06> When a team makes a modification to improve performance or reliability of their *robot*, the team may request a re-inspection of their robot by an Inspector.

<I07> Inspectors evaluate *robot*s to insure that each *robot* has been designed to operate and function safely. The *robot* must be designed for safe operation and handling. Specific safety rules and limitations apply to the design and construction of a *robot*.

<I08> A *robot* is deemed successfully inspected when all items listed on the "Robot Inspection Checklist" have been recorded as "passed" by an Inspector.

<I09> Each *robot* must include a mounting device to securely hold the *Robot Identification Flag* throughout an entire match. Specific regulations can be found in the Robot section of the manual.
   a. The *Robot Identification Flag* mounting device may NOT extend outside the *Robot Sizing Box*.
   b. The *Robot Identification Flag* may NOT extend outside the *Robot Sizing Device* at the start of a match.
   c. It is permissible for the *Robot Identification Flag* orientation to change during the match.
   d. The Mounting device shall provide for easy removal and replacement of the flag between matches.

Field Control Check

During the Inspection Process each robot will be tested to ensure the Robot will properly function with the competition field controls.

There are two methods, one for robots that use VEXnet and one for robots that use 75MHz crystals.

**I. VEXnet: The procedure for robots using VEXnet is as follows:**

1. Set the VEXnet Competition Switch to "DISABLE" and "AUTONOMOUS".

2. Connect the team's Handheld Controller to the VEXnet Competition Switch using an Ethernet Cable.

3. Turn ON the Robot and the Handheld Controller.

4. Wait for the VEXnet LED on the Handheld Controller to turn Green.

5. Verify the ROBOT LED on the Handheld Controller is not Red.
   a. A Red robot LED indicates that a 9V Backup Battery is not installed, not connected, or dead.
      i. Properly install and connect a charged 9V Backup Battery.

6. Verify the GAME LED on the Handheld Controller is Yellow.

   a. Verify that the team has NO control of their robot.

7. Set the VEXnet Competition Switch to "ENABLE" and "AUTONOMOUS".
   a. Verify the GAME LED on the Handheld Controller is Fast Green Blink.
   b. The robot may begin to move if the team has Autonomous Code. Movement is not required.
   c. Verify that the team has NO control of their robot.

8. Set the VEXnet Competition Switch to "DISABLE" and "AUTONOMOUS".

9. Set the VEXnet Competition Switch to "DISABLE" and "DRIVER".

10. Set the VEXnet Competition Switch to "ENABLE" and "DRIVER".
    a. Verify the GAME LED on the Handheld Controller is Slow Green Blink.
    b. Verify that the team has FULL control of their robot.

11. Test Complete!

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VEX Robotics Competition – *Gateway*

II. Crystal: The procedure for robots using 75MHz crystals is as follows:

1. Turn off Transmitter and Robot.

2. Tether the transmitter and the robot controller

3. Turn ON the Robot only.

4. Turn on the Handheld and verify that the robot yellow eye is blinking fast.
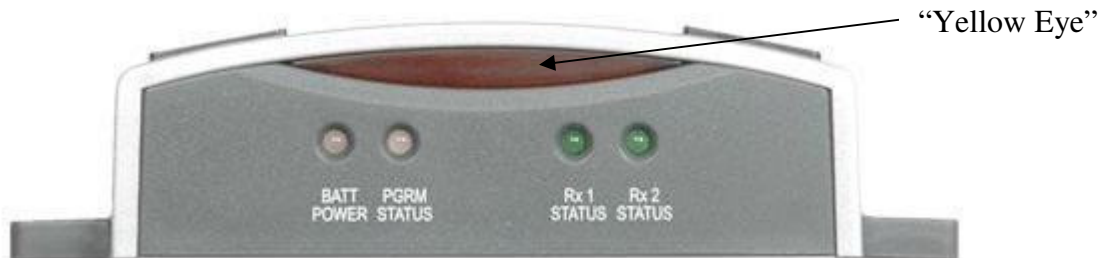
"Yellow Eye"

5. Verify that the yellow eye blinks fast and that transmitter does not control the robot during the autonomous period. (Caution: Robot may move on its own during this period).

6. During Autonomous, Turn Transmitter off.

7. Wait for autonomous period to end (yellow eye stops blinking fast).

8. Verify that user cannot control the robot.

9. Turn transmitter on to enable driver mode.

10. Verify that the user can control the robot with the transmitter.

11. Turn both the transmitter and robot off.

12. Test Complete!

Crystal operation note – On/Off sequence in competition: It is important to understand that once Autonomous starts in a Crystal Radio setup, autonomous will run to completion – even if transmitter is turned off after autonomous starts. In competition, make sure both units are turned off until the transmitter is tethered to the field control system. Then turn the robot on and then turn the transmitter on. Otherwise the robot will run its autonomous routine before the match starts.

Side note: As of the writing of this document, the Driver mode will also run to completion immediately after autonomous with no delay (it should wait for driver mode to start, but it doesn't). If the Driver mode is set to 256 seconds (the default) and the delay between Autonomous and Driver modes is greater than 135 seconds (about 2 minutes), the robot will stop before the end of the driver period. Make sure the delay between Autonomous and Driver modes is less than 2 minutes.

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