

January 14, 2010

TEAM UPDATE #2

GENERAL NOTICES

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No changes.

Section 0 - Introduction

No changes.

Section 1 - Communication

No changes.

Section 2 – Team Organization

No changes.

Section 3 – At the Events

No changes.

Section 4 – Robot Transportation

No changes.

Section 5 – The Awards

No changes.

Section 6 – The Arena

Section 6, Rev B incorporates the following edits:

6.1 OVERVIEW

The specifications for the *Breakaway* ARENA used in competition are listed below in Section 6.1.1. The referenced specifications and construction details of the ARENA can be found on the *FIRST* web site at www.usfirst.org/frc/2010/fielddrawings.html. Note that the web site also contains drawings for low-cost versions of the important elements of the ARENA. Teams may choose to build these versions for their own use during the

construction and testing of the ROBOT. These drawings can be found at www.usfirst.org/frc/2010/fielddrawings.html.

6.2.3 The BUMPS

Two BUMPS are located at approximately one-third of the length of the FIELD. Each BUMP is $1\frac{3}{4}$ inches high off the FIELD surface, 12 inches wide at the top, and extends across the spaces between the TOWER and the Guardrail System. The BUMPS are covered with the same carpet as the rest of the FIELD (although of different colors - red and blue). Each BUMP is colored red or blue, corresponding with the color of the nearest ALLIANCE STATION. The BUMPS are fixed to base plates that are secured to the carpet of the FIELD to keep them from moving. The base plates are covered with the same carpet as the FIELD. Note that this forms a small (approximately $\frac{1}{2}$ -inch tall) transition from the FIELD surface onto the base plates. The edge of the ZONE is defined by the lower edge of the BUMP nearest the ALLIANCE WALL; a collinear virtual line is drawn across the "mouth" of the TUNNEL to complete the edge of the ZONE where the BUMP structure is not in place.

6.2.6 The VISION TARGETS

A VISION TARGET is mounted to the transparent portion of each ALLIANCE WALL, centered above each GOAL opening. The VISION TARGET can be used by on-board vision systems on the ROBOTS to determine the location of the GOAL openings. The VISION TARGET has been specifically designed for easy acquisition and targeting by edge-detection algorithms searching for high-contrast circles. Each VISION TARGET is composed of a set of three concentric white-black-white circles. The VISION TARGET has an outer diameter of 38 inches. Each white circle in the target is $2\frac{1}{2}$ inches wide. The black circle is 5 inches wide. A FIRST logo is placed in the center opening of the VISION TARGET for aesthetics. The logo is not formally considered part of the VISION TARGET.

The *Vision Target* drawing, GE-10063, has been updated to include the specific target dimensions. It is posted at <http://www.usfirst.org/roboticsprograms/frc/content.aspx?id=452> under **Section 6**.

Section 7 – The Game

Section 7, Rev B incorporates the following edits:

<G06> Minimum Score - The minimum final score is zero points.

<G43> ROBOT BALL POSSESSION - ROBOTS may POSSESS only one BALL at a time. *Violation: PENALTY.*

It is important to design your ROBOT so that it is impossible to inadvertently or intentionally POSSESS more than one BALL at a time.

To avoid severe restrictions on robot design, Rule <G43> does not disallow multiple "possession mechanisms." However, if you include more than one active BALL handling MECHANISM it's important to insure that they cannot POSSESS BALLS simultaneously. *Breakaway* would be a dramatically different game if ROBOTS were allowed to POSSESS multiple BALLS. Referees must strictly enforce single POSSESSION. Since referees may find it difficult to determine if additional BALLS in contact with the ROBOT are being herded or POSSESSED, it is imperative that teams avoid ambiguity.

<G45> Active BALL control - ROBOTS may not control BALL direction with active MECHANISMS above the BUMPER ZONE. *Violation: PENALTY.*

MECHANISMS are considered "active" if they are in motion relative to the ROBOT while in contact with the BALL. Resetting or moving MECHANISMS while not in contact with a BALL is permitted as the MECHANISMS are not considered "active."

Section 8 – The Robot

Questions submitted to the FRC Game Q&A revealed that determining if a ROBOT is CARRYING a BALL is nearly impossible as the rules as originally published permitted complete enclosure of BALLS above the BUMPER ZONE. Therefore, **Section 8, Rev B** has been updated to include the following edit:

- <R19>** ROBOTS must be designed so that in normal operation BALLS cannot extend more than 3 inches inside ~~the FRAME PERIMETER below the level of the BUMPER ZONE.~~
- a) the FRAME PERIMETER below the level of the BUMPER ZONE (see figure 8-5).
 - b) a MECHANISM or feature designed to deflect balls in a controlled manner that is above the level of the BUMPER ZONE.

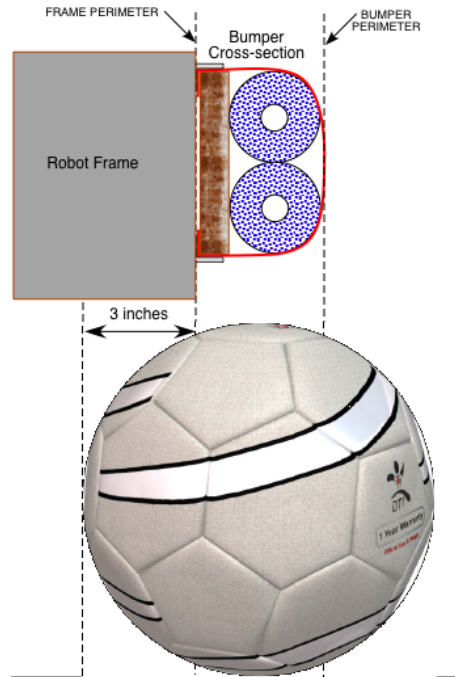


Figure 8-5

The double solenoid pneumatic valves, generously donated by Festo Corporation, require 24V, not 12V as typical in an FRC robot system. To accommodate the voltage, **Section 8, Rev B** has been edited to incorporate the edit below.

The **2010 Robot Power Distribution Diagram, RevA** has also been updated to include the alternate wiring options.

- <R45>** All electric power utilized by the ROBOT shall be distributed from the load terminals of the Power Distribution Board. Circuits may not bypass the Power Distribution Board to connect directly to the 120-amp loop.
- A. The cRIO-FRC power input must be connected to the 24 Vdc supply terminals on the Power Distribution Board. **With the exception of one solenoid breakout board**, no other electrical load can be connected to these terminals.
 - B. The Linksys Wireless Bridge power feed must be connected to the marked 12 Vdc supply terminals located at the end of the Power Distribution Board (i.e. the terminals located between the indicator LEDs, and not the main WAGO connectors along the sides of the Power Distribution Board). No other electrical load can be connected to these terminals.
 - C. If a 5V camera is used (such as the KOP camera), the camera power feed must be connected to the 5 Vdc supply terminals on the Power Distribution Board.
 - D. All other branch circuits must connect to, and have power sourced solely by, a protected 12 Vdc WAGO connector pair on the Power Distribution Board.

- E. Only one wire shall be connected to each WAGO connector on the Power Distribution Board. If multi-point distribution of circuit power is required (e.g. to provide power to the three KOP breakout boards via one 20-amp circuit), then all incoming wires must be appropriately spliced into the main lead, and only one lead inserted into the WAGO connector to connect the circuit.
- F. Sensors and custom circuits may be connected to the 5 Vdc sources on the Analog Breakout boards or the Digital Sidecars. By being logically downstream from the Power Distribution Board, they are protected by the 20-amp breaker at the circuit root.
- G. Servos may be connected to the 6 Vdc sources on the Digital Sidecars (via the designated PWM connections, and with a “6Vdc enable” jumper in place for the corresponding port). By being logically downstream from the Power Distribution Board, they are protected by the 20-amp breaker at the circuit root. No other electrical load can be connected to these sources.

Section 9 – The Tournament

No changes.

Section 10 – The Kit of Parts

The **2010 Kit of Parts Checklist, Rev A** has been updated to include the following edits:

- The FisherPrice motor has a 19-tooth pinion (not a 16-tooth pinion)
- The voltage for the FESTO solenoid valve is 24V (not 12V)
- The part number for the FESTO valve is now included, VUVG-L10-B52-T-M5-1P3-566458.

Section 10, Rev A has been updated to include the following edit:

8.4.2 Sensing

Sensor Panel - The 2010 Kit of Parts contains a sensor panel including a gyro and accelerometer. For details about these devices, please reference the *2010 Sensors Manual* which will be posted on the *FIRST* website at <http://www.usfirst.org/community/frc/content.aspx?id=452>.

Optical Encoder - Details for the optical encoders found in the kit can be found on the US Digital website at <http://www.usdigital.com/products/encoders/incremental/rotary/kit/e4p/>.

Magnetic Encoder - Details for the magnetic encoders found in the kit can be found on the austriamicrosystems website at www.austriamicrosystems.com.

Axis 206 Camera - Details about the Axis 206 camera found in the kit can be found on the Axis website at http://www.axis.com/products/cam_206/index.htm.