INSPECTOR: _____   **TEAM NUMBER:** _____

INITIALS (after passing): _____   **DATE (after passing):** _____/_____/_____

REINSPECTION (initial) _____   **FINAL INSPECTION (initial)** _____

Initial Inspection

_____ **Weight** - Includes all mechanisms and bumpers, excludes battery assembly, ≤ 120lbs. <R04> _____ pounds

Modified Weight 2_____ pounds   Modified Weight 3_____ pounds   Finals Weight_____ pounds

_____ **Size** – TRANSPORT CONFIGURATION may not exceed 28" x 42" x 78" H, including any bumpers. <R03, G22>

Bumpers – <u>Optional for 2015</u>, but if used, are part of the robot per Sec. 4.1.

Mechanical

_____ **No Sharp Edges, or Protrusions that pose a hazard for participants, robots, arena, or field.** <R07>

_____ **No Prohibited Materials** – e.g. sound, non-Class 1 lasers, noxious/toxic gases, inhalable particles/chemicals (includes mercury). <R08>

_____ **No Unsafe Energy Storage Devices** - Carefully consider safety (release and transport) of stored energy or pneumatic systems. Lockouts may be required for safe operation and transport. <R08, T13>

_____ **No Risk of Damage to Other Robots** - e.g. spearing, entangling, upending or adhering. <G16, R08>

_____ **No Risk of Damage to Field** – e.g. metal cleats on traction devices or sharp points on frame. <R05>

_____ **Decorations** - Cannot interfere with other robots' electronics and sensors and be in spirit of "Gracious Professionalism." <R08-C>

_____ **BoM Cost** – Total cost of additional components ≤ $4000, no single component >$400. <R09, R10, R11>

_____ **Team Numbers –** Must be at least 3 ½" tall, ½" stroke, black numbers with at least 1" of white border, and visible from all sides of the ROBOT. <R02>

_____ **Start of Match** – Team may use hardware and/or handheld tools (including battery powered) to reconfigure ROBOT from TRANSPORT CONFIGURATION and prepare for MATCH PLAY. <R03, G09, G10>

_____ **End of Match –** Game elements can be removed from ROBOT when not powered and ROBOT can be returned to TRANSPORT CONFIGURATION with handheld tools. <R06, G09, G11>

Electrical

_____ **COTS Components –** No motors or Control System components may be modified, except for motor mounting, output shaft can be modified, motor wires may be trimmed, window motor locking pins may be removed, connector housings on window, door, windshield, seat and Bosch motor may be modified to facilitate connections and certain devices may be repaired with parts identical in specification and performance to the originals. <R19, R55>

_____ **Battery** - One 12 volt/17-18.2 SLA battery, securely fastened to robot & properly insulated. <R20 - R23>

_____ **2015 Control System** – Must be used and easily visible and wired as in Fig 4-2 to 4-5. <R29, R45, Sec 4.8, Sec 4.9>

_____ **MXP** – If using PWM, must be passive or one of three approved COTS boards (Kauai Labs, RCAL, Rev Robotics). <R58>

_____ **Main Breaker Accessibility** – A single 120A main breaker must be readily accessible and visible for inspection. <R28>

_____ **Allowable PDP Breakers & Fuses** - Only VB3-A Series or MX5-A40 breakers may be installed and visible for inspection. Fuses must be mini automotive blade matching value printed on PDP. <R35, R36>

_____ **Robot Radio** – The DAP-1522 Rev B, wireless adapter must be powered via the +5 volt/2 amp output of the VRM (and the only load on those terminals). The VRM powering the Radio must be plugged into the designated supply terminals on the PDP (With the exception of one (1) PCM, no other load may be connected to those terminals). Radio must be mounted so LEDs are visible when on the field. <R32, R33, R46, R53>

_____ **Wire Size** - Obey the wiring size conventions for circuit protection used.

☐   All wire from battery to PDP must be min #6 AWG (4.11mm) wire <R25 & Fig.4-2>

☐   40 amp breakers must be min #12 AWG (2.052mm) wire <R38>

☐   30 amp breakers must be min #14 AWG 1.628mm) wire <R38>

☐   20 amp breakers must be min #18 AWG (1.024mm) wire <R38>

_____ **Wire Colors** - Must be color coded - red/ yellow/white/ brown/black w/stripe for +24, +12, +5 VDC supply wires and black/blue for supply return wires. <R40>

_____ **1 Wire per WAGO** - Only 1 wire may be inserted in each WAGO. Splices and/or terminal blocks may be used to distribute power to multiple PCMs/VRMs, but all wires in the splice are subjected to the Wire Size rules. <R26, R34 >

_____ **Servos** – Must have a max power rating of 4 watts, wired to roboRIO PWM or MXP outputs. <R18, R43, R57>

_____ **Actuators** – Electrical solenoid actuators, max. 1 in. stroke and no greater than 10 watts @12V continuous duty. <R18>

_____ **Motors** – No more than **6** CIMs Qty: ___, and unlimited quantity of: <R18 & Table 4-1>

Motor	Part Number	Motor	Part Number	Motor	Part Number
BaneBots	M7-RS775-18 / RS775WC-8514 M7-RS775-12/RS775PH-6221 M5-RS550-12 / RS550VC-7527 M5-RS550-12-B / RS550VC-7527L	AndyMark PG	am-2161 / am-2765 am-2194 / am-2766	Automotive Window Automotive Door	Various
		AndyMark 9015	am-0912	Automotive Windshield Wiper	
Denso Throttle Control	AE235100-0160	Snow Blower	am-2235	Automotive Seat	
Vex Bag / mini-CIM	217-3351 / 217-3371	Bosch	6004 RA3 353-01	CIM	

____   **Motor/Actuator Power** – CIMs, AM 9015s, Banebots, & VEX motors must be fed by only one (1) motor controller. Each motor controller may have up to two (2) of other motors connected to load terminals (Table 4-4). Single specified motors may be connected to Spike (however multiple pneumatic valves may be driven by a single Spike). <R42, Table 4-4>

____   **Motor/Actuator Control** – Motors/actuators must be controlled by Spike, Talon, Talon SRX, Victor 884, 888, SP or Jaguar and driven directly by roboRIO via PWM signals or CAN bus but not both.<R41, R57-R62>

____   **Custom Circuits, Sensors and Additional Electronics** - Cannot directly control speed controllers, relays, actuators or servos and may not produce voltage in excess of 24 volts. <R30 & R44>

____   **Spike Fuse** – Spike must have 20 amp fuse installed. When used with compressor, fuse may be replaced with 20 amp, snap action, breaker (recommended). <R55.D>

____   **Isolated Frame** – Must be electrically isolated from battery. (>10k Ohm b/w either PDP battery post and frame) <R27>

____   **roboRIO Power** – The roboRIO must be powered from the dedicated supply terminals on the PDP shown in Figure 4-3 (No other load may be connected to these terminals). <R31>

Pneumatic System W/ On Board or Off Board Compressors(n/a for robots that do not use pneumatics)

____   **No Modifications** - Pneumatic parts may not be modified except actuator mounting pins may be removed. <R65>

____   **Compressor** – <u>One only</u> compressor (12V, max 1.05 CFM flow rate) may be used (on or off robot). <R68>

____   **Compressor Power** – Wired to PCM or Spike Relay, under control of the roboRIO. <R42, R69>

____   **Compressor Control** – A Nason P/N: SM-2B-115R/443 switch must be wired directly to the PCM or roboRIO. <R77>

____   **Compressor Relief Valve** – Set to 125 psi, attached to the compressor outlet port via hard, legal fittings. <R67 & R76>

____   **Vent Plug Valve** – Must include an easily-accessible manual vent plug valve to release all system pressure. <R78>

____   **Off-Robot Compressor (if used)** – Must include an additional vent plug valve. The roboRIO must be used to control and power the compressor. The High Pressure Switch & gauge, and regulator can be located off-board. <R74-R75, R78>

____   **Components** – All must be unmodified KOP items or COTS listed in R66, rated for 125 psi working pressure (except for solenoid valves per R66D). <R64-R66>

____   **Tubing** – Equiv. to KOP with a maximum ID of 0.160" with screen printed rating or supporting documentation. <R66.E>

____   **Pressure Regulator** – Set to ≤ 60 psi, providing all working pressure.<R71>

____   **Gauges -** Must be installed on both sides of pressure regulator to indicate both the high pressure (storage) and low pressure (working) and be readily visible. <R67, R73>

____   **Pressure Rating** – Any solenoid valves rated for less than 125 psi must have another relief valve installed on working pressure side to vent at the lower pressure. <R64 & R66.D>

____   **Valve Control** - Pneumatic solenoid valves must have a max ⅛" NPT ID, be controlled by either a Spike or PCM module. Valve outputs may not be plumbed together. <R42, R66.C, R79>

Power On Check (Driver Station must be tethered to the Robot)

____   **Unauthorized Wireless Communication** – No wireless communication to/from ROBOT or OPERATOR CONSOLE without prior FIRST written permission. No radios allowed on the OPERATOR CONSOLE or in the pit. <R52, R84, T4, T5, T21>

____   **Confirm Pneumatics Operation** – With no pressure in system, compressor should start when robot is enabled.
- ☐   Compressor should stop automatically at ~120 psi under roboRIO control. <R77>
- ☐   Stored Pressure ≤ 120 psi <R70> and Working Pressure ≤ 60 psi. <R71, R74>

____   **Robot Signal Light** – One or two Robot Signal Light(s) from the KOP must be visible from 3' in front of the robot, and be plugged into the RSL port on the roboRIO. Confirm jumper b/w La and Lb terminals so the RSL flashes in sync with roboRIO indicator. <R54>

____   **PDP CAN Bus –** PDP CAN bus must be wired to roboRIO CAN bus even if CAN is not used. <R61>

____   **Verify Team Number on DS –** The DS Status Pane shows the correct Team Number. <R50>

____   **Software Versions** – Software/firmware for devices is at or above listed versions
- ☐   Driver Station – 08021500 or newer <R80> (Note the version number is a date in the format of, DD/MM/YY00)
- ☐   roboRIO – v23 <R45>
- ☐   Talon SRX – v.28 for PWM, v1.01 for CAN <R41, R59>
- ☐   Jaguars – v109 <R59>
- ☐   PCM – v1.62 <R60>
- ☐   PDP – v1.37 <R61>

____   **Power Off –** Remove power from the robot, confirm all LEDs are off, actuate pneumatic vent plug valve and confirm that all pressure is vented and all pressure gauges read 0 psi pressure. <R78>

____   **Driver Console -** Is less than 60" x 14". May have velcro to secure to Driver's Station shelf. <R83>

Team Compliance Statement

We, the Team Mentor and Team Captain, attest by our signing below, that our team's robot was built after the 2015 Kickoff on January 3, 2015 and in accordance with all of the 2015 FRC rules, including all Fabrication Schedule rules. We have determined that our robot satisfies all of the 2015 FRC rules for robot design. **We understand that any changes to the robot, except those listed in T10A-F, must be re-inspected and all stored air pressure on the robot is obtained using one and only one, legal compressor, operating only under roboRIO control.**

Team Captain:_____   Team Mentor:_____