



- \_\_\_ **1 Wire per WAGO** - only 1 wire may be inserted in each WAGO connector on the PDP, splices and/or terminal blocks, may be used to distribute power to multiple branch circuits but all wires in the splice are subject to the wire size rules. <R45>
- \_\_\_ **Actuators** – Electrical solenoid actuators, max. 1 in. stroke and no greater than 10 watts at 12V continuous duty. <R29>
- \_\_\_ **Motor/Actuator Power** –CIMS, Banebots, AM 9015, WCP RS775 Pro, VEX Bag and MiniCIM motors must be fed by only one motor controller. A motor controller may have up to two of the other motors connected to the load terminals. Single specified motors may be connected to a relay module (multiple pneumatic valves may be driven via one relay module. <R53>
- \_\_\_ **Motor/Actuator Control** – Motors/actuators must be controlled by legal motor controllers and driven directly by PWM signals from roboRIO or through legal MXP board or by CAN bus.<R68-R73>
- \_\_\_ **Servo Control/Power** – Servos must be connected to only the PWM ports on the roboRIO. <R54>
- \_\_\_ **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. <R41 & R69>
- \_\_\_ **Pneumatic Control Module (PCM)** - PCM modules must be connected to roboRIO via CAN bus. <R71>
- \_\_\_ **Spike Fuse** – Spike must have  $\leq 20$  amp fuse installed. When used for compressor control only the Spike fuse may be replaced with 20 amp, snap action, breaker (recommended). <R48 & R66D>
- \_\_\_ **PDP Fuse** – The fuses in the PDP must be mini automotive blade fuses rated for either 10 or 20 amps. <R47>
- \_\_\_ **Allowable PD Breakers** - Only Snap-Action breakers that are  $\leq 40$  Amps may be installed in the PDP. <R46 & R48>
- \_\_\_ **Isolated Frame** – Must be electrically isolated from battery, roboRIO must be insulated from frame. ( $>3k$  Ohm between either PDP battery post and chassis) <R38>
- \_\_\_ **Terminals** – Each terminal on the battery, main breaker, and connectors must be fully isolated. <R34>

### **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 those listed in R76 A-E. <R76>
- \_\_\_ **Compressor** - Only one compressor with a max 1.1 CFM flow rate at 12 VDC may be used (on or off robot). <R79>
- \_\_\_ **Compressor Power** - Must use the PCM or Spike to power the compressor. <R53>
- \_\_\_ **Compressor Control** – A Nason P/N SM-2B-115R/443 switch must be wired directly to the PCM or roboRIO. <R88>
- \_\_\_ **Compressor Relief Valve** – Set to 125 psi, attached to (or through legal hard fittings) to compressor outlet port.<R87>
- \_\_\_ **Vent Plug Valve** – Must include an easily-accessible manual vent plug valve to release system pressure.<R78.D, R89>
- \_\_\_ **Off-Robot Compressor (if used)** – Must include an additional vent valve and relief valve. The robot control system must be used to control and power the compressor. The high pressure switch and gauge can be located off-board.<R85-R89>
- \_\_\_  **tubing** – Equiv. to KOP with a maximum ID of 0.160” with screen printed rating or supporting documentation. <R77E>
- \_\_\_ **Relieving Pressure Regulator** – Set to  $\leq 60$  psi, providing all working pressure. <R82>
- \_\_\_ **Gauges** - must be present at both the high pressure side and low pressure regulator(s) outlet and be easily visible. <R84>
- \_\_\_ **Pressure Rating** - All pneumatic components must be rated for at least 120 psi working pressure except solenoid valves. If valves are rated for less than 120 psi, another relief valve must be installed on working pressure side to vent at the lower pressure. <R75 & R77D>
- \_\_\_ **Valve Control** - Pneumatic solenoid valves must have a max 1/8” NPT, BSPP, or BSPT ID, be controlled by either a PCM or Spike. Valve outputs may not be plumbed together. <R53, R77C & R90>

### **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 <R63 & R95>
- \_\_\_ **Confirm Pneumatics Operation** – With no pressure in system, compressor should start when robot is enabled.
  - Compressor should stop automatically at  $\sim 120$  psi under roboRIO control. < R79-R81>
  - Main Pressure  $\leq 120$  psi and Working Pressure  $\leq 60$  psi. <R81 & R82>
- \_\_\_ **Robot Signal Light(s)** - The Robot Signal Light (two max.) from the KOP must be visible from 3’ in front of the robot, and be plugged into the RSL port on roboRIO. Confirm that the RSL flashes in sync with roboRIO. <R65>
- \_\_\_ **PDP CAN Bus** – PDP CAN bus must be wired to the roboRIO CAN bus. <R72>
- \_\_\_ **Verify Team Number on DS** – Check that the Team Number is correct on the DS Status Pane. <R61>
- \_\_\_ **Confirm programming of wireless bridge** - Confirm the Team has programmed the OpenMesh Wireless Bridge at kiosk for this event. <R57>
- \_\_\_ **Firmware Versions** – Software/firmware for devices is at or above listed versions below:
 

<input type="checkbox"/> Driver Station – 16.0.2 <R91>	<input type="checkbox"/> Jaguars – V109 <R70>
<input type="checkbox"/> roboRIO (Image - FRC_2016_v19 and Firmware – v3.0.0) <R56>	<input type="checkbox"/> PCM – 1.62 <R71>
<input type="checkbox"/> Talon SRX – V1.01 (cannot be greater than V10.0) <R70>	<input type="checkbox"/> PDP – 1.37 <R72>
- \_\_\_ **Power Off** – Remove power from the robot, confirm all LEDs not on COTS computing devices of self-contained cameras are off, actuate pneumatic vent plug valve and confirm that all pressure is vented and all gauges read 0 psi pressure. <R31 & R89>
- \_\_\_ **Driver Console** - Less than 60” x 14”. May have hook tape to secure to Driver’s Station shelf. <R94>

### **Team Compliance Statement**

We, the Team Mentor and Team Captain, attest by our signing below, that our team’s robot was built after the 2016 Kickoff on January 9, 2016, in accordance with all of the 2016 FRC rules, including all Fabrication Schedule rules, and that any software or designs that were created before kickoff were publicly available before January 9<sup>th</sup>, 2016. We have conducted our own inspection and determined that our robot satisfies all of the 2016 FRC rules for robot design.

Team Captain: \_\_\_\_\_

Team Mentor: \_\_\_\_\_