

# Team 4381 Wiring Standards for FRC Robots

All wiring will comply with FRC rules released for each game season. Electrical Sub-Team members are expected to thoroughly review the electrical wiring rules for the current game on the day of game reveal.

## High Current Wiring Standards (applies to AWG-16 to AWG -6 wire gauges)

**AWG 6 wire** is used solely for main power feed from the Battery to Main Circuit Breaker and from Main Circuit Breaker to the Power Distribution Panel (PDP)

Red AWG 6 (AM-2841) Class K wire measured and cut to length terminated and crimped to a ring terminal and to a Anderson SB-50A Terminal.


Black AWG 6 (AM-2840) Class K wire measured and cut to length terminated and crimped to a ring terminal and to a Anderson SB-50A Terminal.

**AWG 12 - AWG 16 wire** Used for branch circuits to connect PDP terminals to Motor Controllers and then to Motors. Game rules and motor power draw determines the wire size.

Terminated in JEGS Weather Pack Connectors for AWG 12 - AWG 16 wire terminals. Terminals will be inserted into Two -Position Male and Female connector housings. Male-Female extension wire sets will be cut to length as needed.



## Low Current Wiring Standards (applies to AWG 18 to AWG 24 wire gauges)

1. Wires will be measured and cut to the necessary length as needed.
  - a. The insulation will be removed to a 3/8" length and terminated in a DEUTSCH 0460-202-16141 male pin before inserting into the am-3827 CAN Connector.  

  - b. Heat Shrink will be applied over the exposed pin/wire as needed to prevent a short circuit condition with adjacent pins.
2. Extending low current wire
  - a. When it is necessary to extend the length of low current wires, extension wire will be soldered to wires of the same AWG size and color with heat shrink applied to insulate the exposed

conductors. Wire extensions will be measured and cut to fit the needed length with considerations for strain relief at hinged panels.

- i. Conductors that complete the circuit will be twisted together to keep the wire set contiguous. This prevents cross-circuit wiring.
- ii. The wires will have the insulation removed to a 1/2" length and be soldered together.
- iii. Heat Shrink will extend a minimum of 1/2" over the wire insulation at each end of the splice.

### **Wiring practices**

1. Low Current Wires will be connected and secured to the Modular Electric Panel before high current wiring begins.
  - a. Planning is encouraged so that Low Current and High Current wires are not bundled together to the greatest extent possible
2. Where signal wires are routed alongside high current wires, the following strategies will be used to minimize NEXT (Near End Cross-Talk) signal interference on the signal wires.
  - a. The first option is that signal Wire bundles will be routed apart from High Current Wire bundles
  - b. When choice A is not possible, signal wiring will cross High Current Wires at right angles.
  - c. If option B is not possible shielded low current wire will be used for signal wires to prevent NEXT signal interference. The shield will be grounded at one end of the circuit.
3. High Current wire termination at PDP
  - a. Insulation will be removed to expose 1/2" wire before the wire is inserted into the PDP clamp
  - b. A Strain Relief of 1" additional wire will be provided at the PDP to prevent wires from being pulled away from the clamps.
  - c. To the greatest extent possible, High Current Wires will be bundled and routed together
4. Strain relief loops will be used at locations on the robot where the hinged end of the Modular Electronics Board is fastened to the chassis frame.