

## Team Update 08

### General

#### Control System

[Game Tools 2024 Patch 1](#) is posted with the following updates:

- DS - fix for incorrect printing of error messages
- DS - bug fix that eases requirements of new watchdog behavior
- DS - clicking the button to download logs with no connected roboRIO doesn't lock DS for 60s
- Log File Viewer - fix window loading off screen
- roboRIO Image version 2024\_v2.2 - NetworkTables fixes for teams using LabVIEW. C++\Java teams may use this image, but will see no change from version 2024\_v2.1.

#### Inspection Checklist

The [Inspection Checklist](#) is available on the [Season Materials webpage](#).

### Game Manual

#### Section 8.6 Power Distribution

**R601** **\*Battery limit – everyone has the same power.** The only legal source of electrical energy for the ROBOT during the competition, the ROBOT battery, must be 1 and only 1 non-spillable sealed lead acid (SLA) battery with the following specifications:

- Nominal voltage: 12V
- Nominal capacity at 20-hour discharge rate: minimum 17Ah, maximum 18.2Ah
- Shape: Rectangular
- Nominal Dimensions: 7.1 in. x 3 in. x 6.6 in., +/- .1 in. for each dimension (~ 180 mm x 76mm x 168 mm, +/- 2.5 mm for each dimension)
- Nominal weight: 11lbs. to 14.5 lbs. (~5 kg. to 6.5 kg.)
- Terminals: Nut and bolt style

"Nut and bolt style" refers to any style battery terminal where the connector is secured to the battery using a threaded fastener.

Examples of batteries which meet these criteria include:

- Energys (P/N NP18-12, NP18-12B, NP18-12BFR),
- MK Battery (P/N ES17-12),
- Battery Mart (P/N SLA-12V18),
- Sigma (P/N SP12-18),
- Universal Battery (P/N UB12180),
- Power Patrol (P/N SLA1116),
- Werker Battery (P/N WKA12-18NB),
- Power Sonic (P/N PS-12180NB),
- Yuasa (P/N NP18-12B),

- J. Panasonic (P/N LC-RD-1217),
- K. Interstate Batteries (P/N BSL1116), and
- L. Duracell Ultra Battery (P/N DURA12-18NB).

Teams should be aware that they may be asked to provide documentation of the specifications of any battery not listed above.

Batteries should be charged in accordance with manufacturer's specification. (Please see the [FIRST Safety Manual](#) for additional information.)

**R621 \*Protect circuits with appropriate circuit breakers.**
*Table 8-3 Branch circuit protection requirements*

Branch Circuit	Circuit Breaker/ <b>Fuse</b> Value	Quantity Allowed Per Breaker
<b>Motor Controller</b>	Up to 40A	1
<b>CUSTOM CIRCUIT</b>	Up to 40A	No limit
<b>Automation Direct Relay 40A (*6M40*)</b>	Up to 40A	1
<b>Fans permitted per <a href="#">R501</a> and not already part of COTS computing devices</b>	Up to 20A	No limit
<b>Spike Relay Module</b>	Up to 20A	1
<b>Automation Direct Relay 25A (*6M25*)</b>	Up to 20A	1
<b>PCM/PH – with compressor</b>	Up to 20A	1
<b>Additional VRM (non-radio)/Additional PCM/PH (non-compressor)</b>	Up to 20A	3 total
<b>Automation Direct Relay 12A (*6M12*)</b>	Up to 10A	1