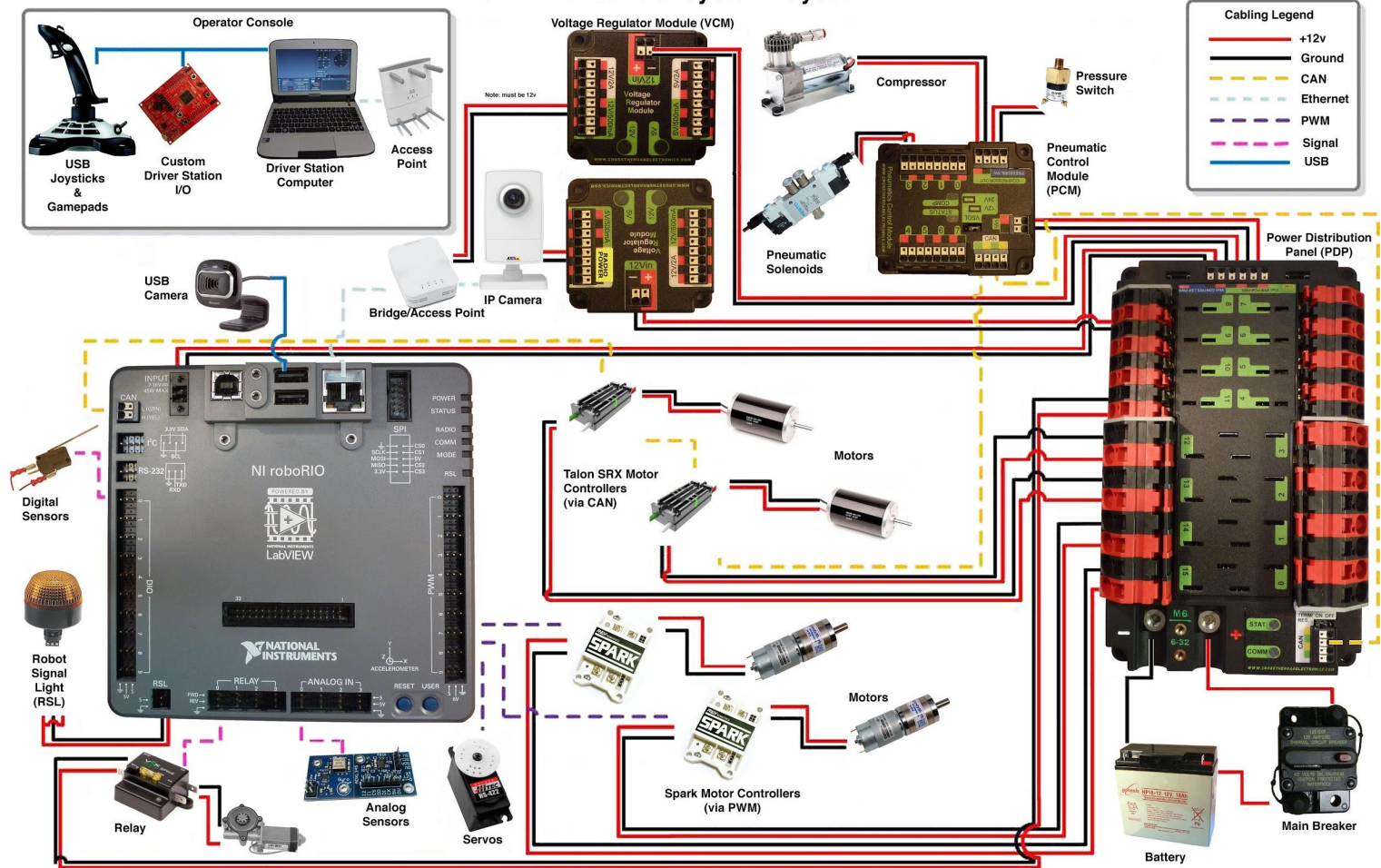# 2890 The Hawk Collective

Electrical Level 1 - Identification of base components.

# 2017 FRC®Control System Layout
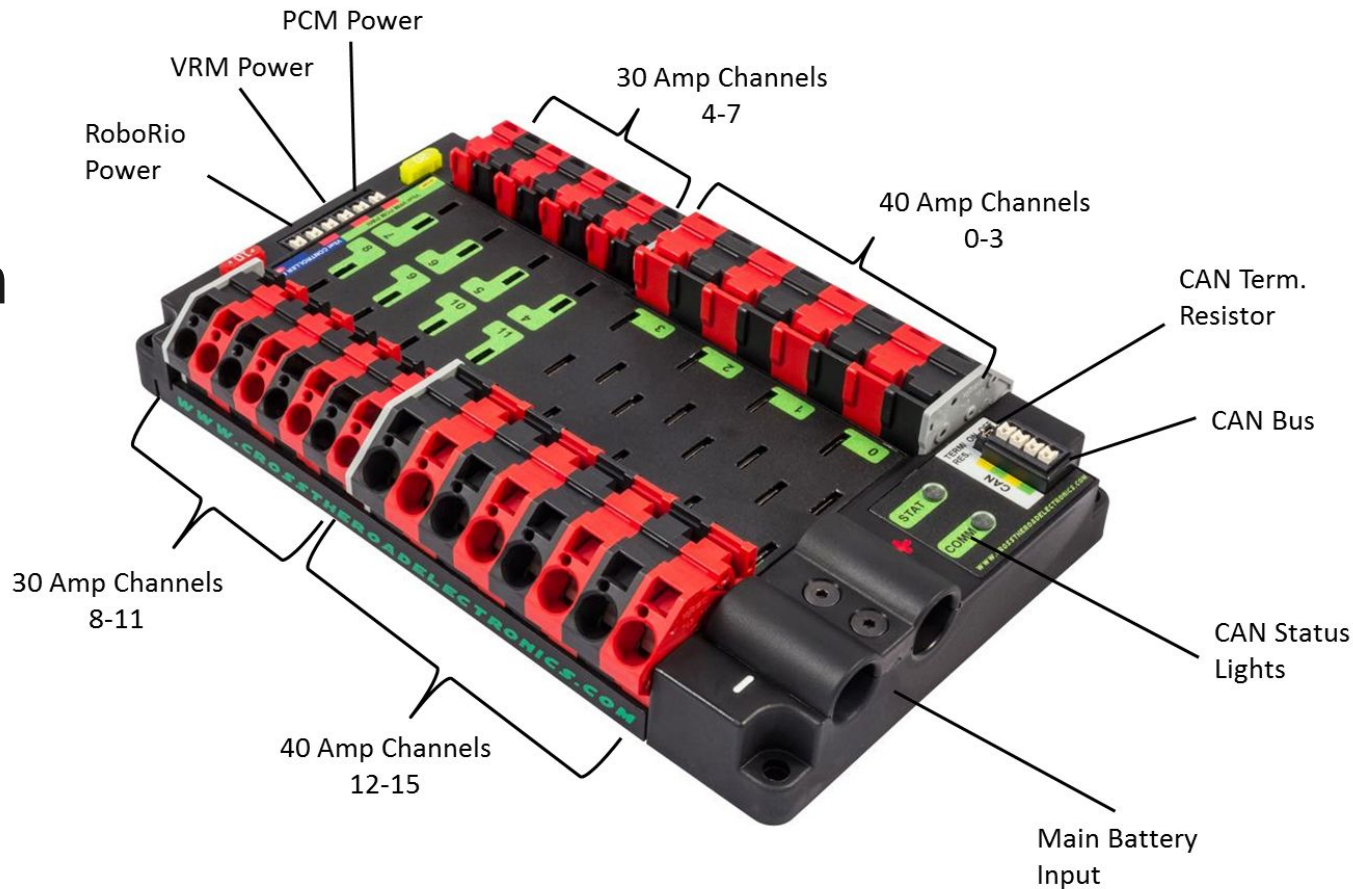


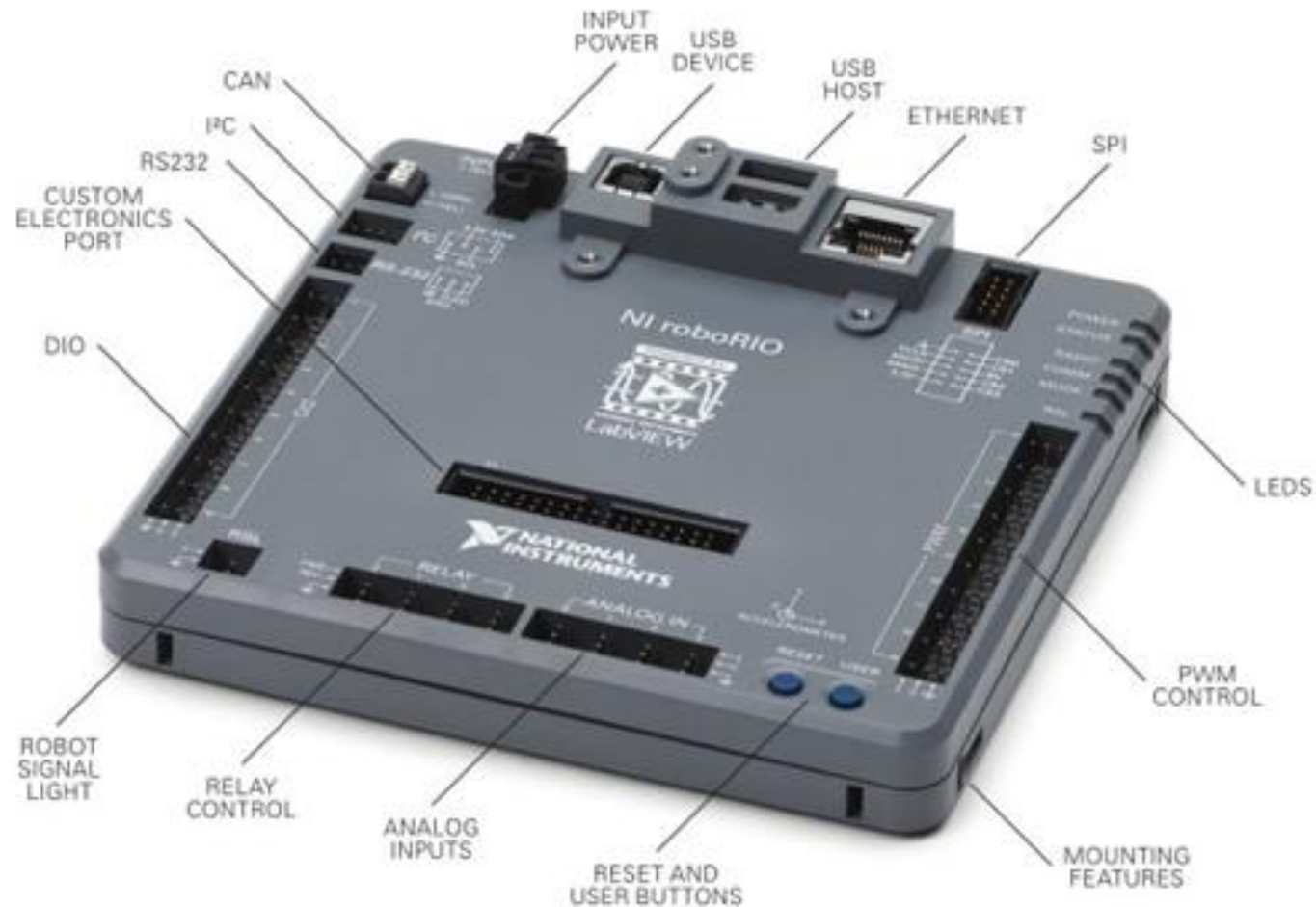FRC Robot Wire Guide

# Battery

# Main Breaker

# Power
# Distribution
# Board

PCM Power

VRM Power

RoboRio Power

30 Amp Channels 4-7

40 Amp Channels 0-3

CAN Term. Resistor

CAN Bus

30 Amp Channels 8-11

40 Amp Channels 12-15

CAN Status Lights

Main Battery Input

# Robot Rio

# Voltage Regulator

Unregulated 12V Input

Regulated 5V 2A Peak

Regulated 5V 500mA Peak

Regulated 12V 2A Peak

Regulated 12V 500mA Peak

Regulator Circuit Status Lights
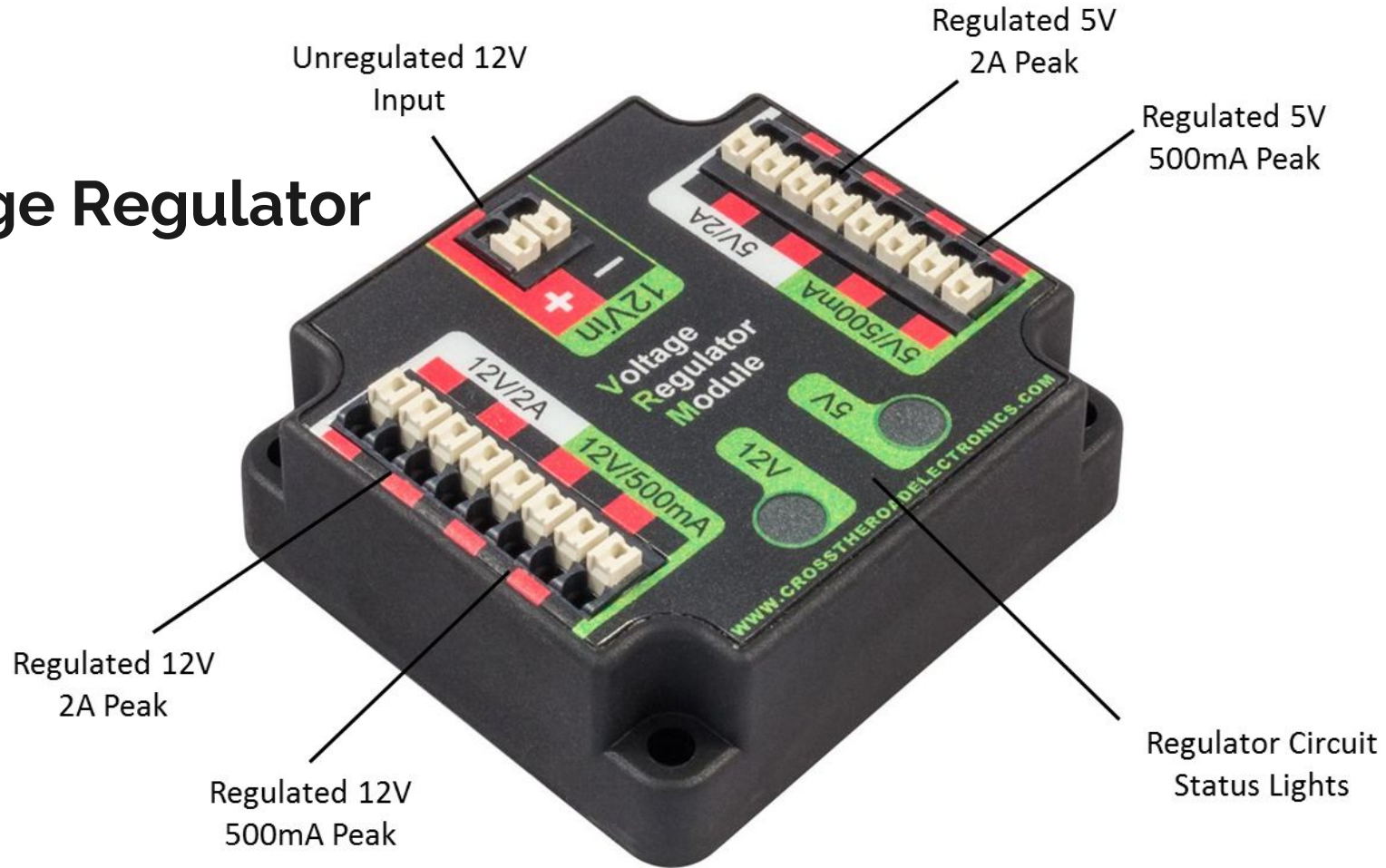
# **P**neumatic **C**ontrol **M**odule

CAN Bus Interface

Unregulated 12V Input

12V or 24V Output Jumper (Default is 12V)

12/24V Solenoid Channels 4 - 7

Pressure Switch Direct Wire

Compressor Direct Wire

12/24V Solenoid Channels 0 - 3

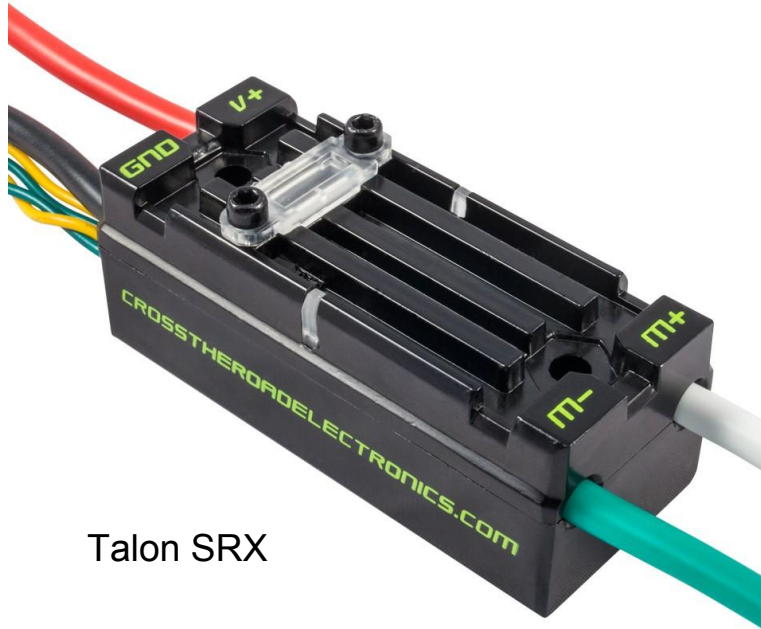Status Lights
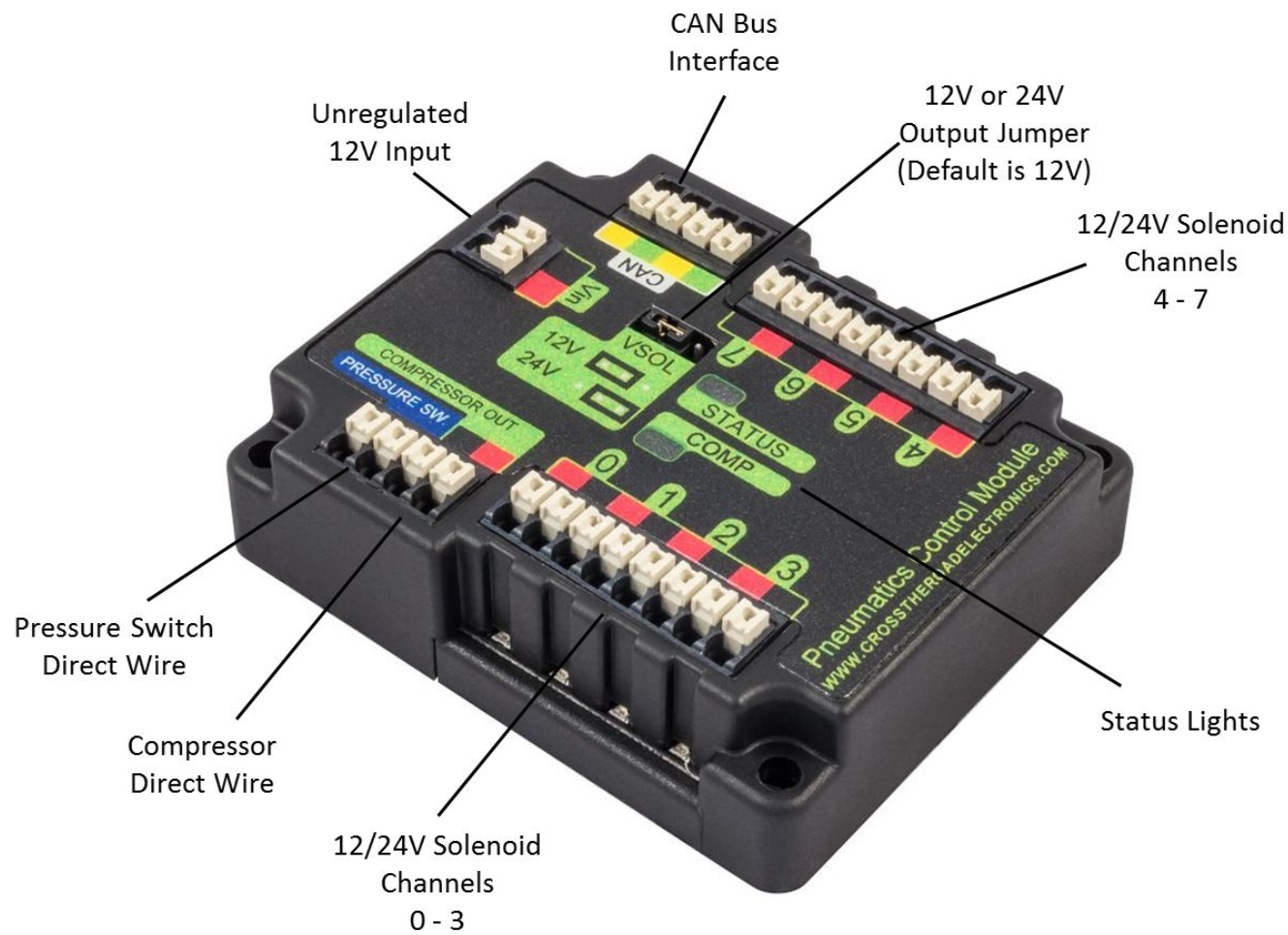
# Radio

# Motor Controller



Talon SRX



JAGUAR

VICTOR 888

TALON SR

TALON SRX

VICTOR SP

# Motor Controller

**We will dive deeper into motor controllers in E2.  For E1 be aware of the options available for FRC teams.**

**Review these items: Take note of the Control Systems (CAN vs PWM) and maximum AMPS.**

https://content.vexrobotics.com/vexpro/pdf/Victor-SP-Talon-SRX-Info-Sheet-20140819.pdf

http://www.revrobotics.com/rev-11-1200/

http://www.revrobotics.com/content/docs/REV-11-1200-QS.pdf

http://www.mindsensors.com/frc/135-sd540b-pwm-motor-controller-for-frc

http://www.mindsensors.com/frc/183-sd540c-can-based-motor-controller-for-frc

# Wire Size

FRC has strict rules about what size wire can be used for what parts. To achieve Level 2 you will have to memorize the rules and be able to apply them. For Level 1 you need to understand that bigger wires are used for more power hungry things such as motors, compressors, and batteries. Most of the time you can find the wire size or GAUGE of the wire by reading the print on plastic jacket around the wire.

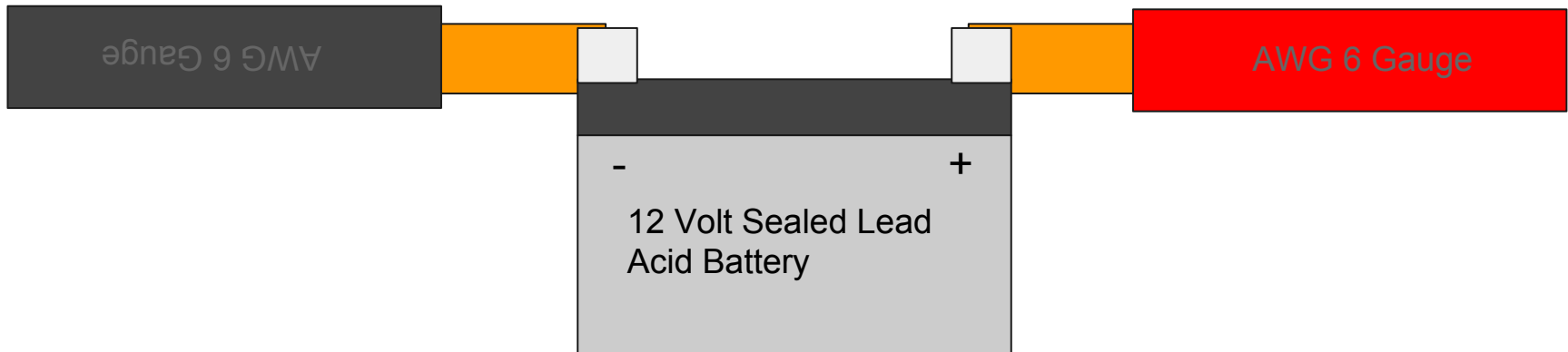The lager the wire's physical size, the lower the number   Gauge 6> Gauge 8

AWG 6 Gauge

AWG 14 Gauge

# Wire Pairs

Electricity needs a "Complete Circuit" (closed Loop) to flow. To achieve this the wires are often paired.

**Black wire = Negative**

**Red wire = Positive**

AWG 6 Gauge

AWG 6 Gauge

-

+

12 Volt Sealed Lead Acid Battery

# To Achieve Electronic Technician Level 1

1.  Read this presentation and memorize the names of each part, paying close attention to the differences between each part.
2.  Take the Pretest for Electronics Technician Level 1
3.  Schendle an in person test with a Electronics Trainer

# Next-Electronic Technician Level 2

1.  Understand the basic signaling protocols <u>needed</u> to assemble a  board.
2.  Correctly build a complete board (including PCM)
3.  Demonstrate Crimping skills
4.  Demonstrate Solder Skills
5.  Understand Team approved Connector methods/systems.