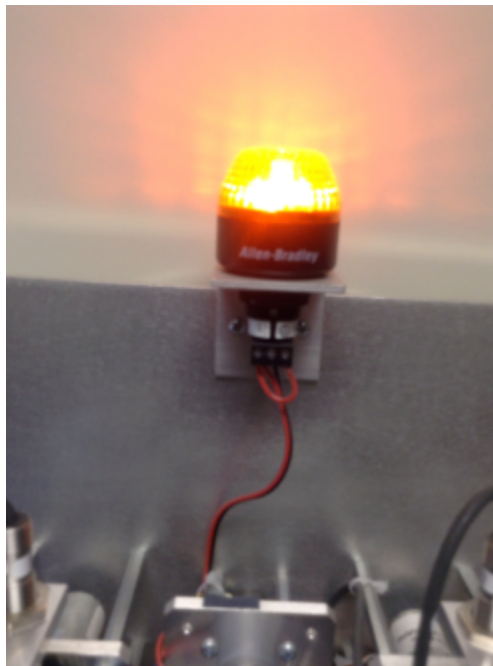


Status Light Quick Reference

Many of the components of the FRC Control System have indicator lights that can be used to quickly diagnose problems with your robot. This guide shows each of the hardware components and describes the meaning of the indicators. Photos and information from Innovation FIRST and Cross the Road Electronics.

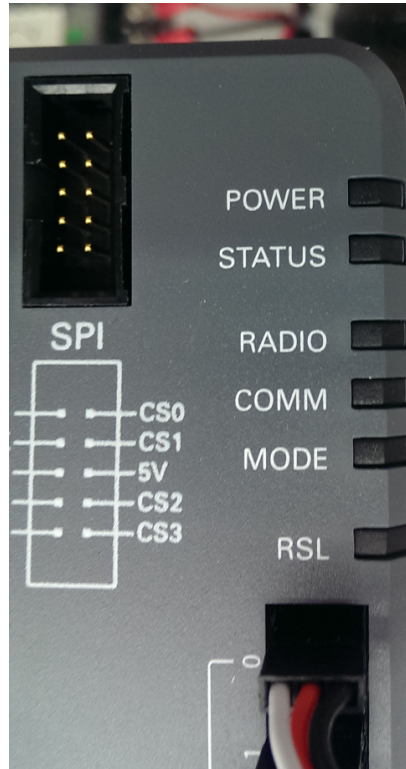
Robot Signal Light (RSL)



- Solid ON - Robot On and Disabled
- Blinking - Robot On and Enabled
- Off - Robot Off, roboRIO not powered or RSL not wired properly.

Status Light Quick Reference

RoboRIO



Power

- Green - Power is good
- Amber - Brownout protection tripped, outputs disabled
- Red - Power fault, check user rails for short circuit

Status

- On while the controller is booting, then should turn off
- 2 blinks - Software error, reimage roboRIO
- 3 blinks - Safe Mode, restart roboRIO, reimage if not resolved
- 4 blinks - Software crashed twice without rebooting, reboot roboRIO, reimage if not resolved
- Constant flash or stays solid on - Unrecoverable error

Radio

Not currently implemented

Status Light Quick Reference

Comm

- Off - No Communication
- Red Solid - Communication with DS, but no user code
- Red Blinking - E-stop
- Green Solid - Good communication with DS

Mode

- Off - Outputs disabled (robot in Disabled, brown-out, etc.)
- Amber/Orange - Autonomous Enabled
- Green - Teleop Enabled
- Red - Test Enabled

RSL

See above

OpenMesh Radio

Power	
Blue	On or Powering Up
Blue Blinking	Powering Up
Eth Link	
Blue	Link Up
Blue Blinking	Traffic Present
WiFi	
	Bridge Mode, Unlinked or non-FRC firmware
Off	
Red	AP, Unlinked
Yellow\Orange	AP, Linked
Green	Bridge Mode, Linked

WiFi light only works after radio has been power cycled.



Status Light Quick Reference

Power

- Blue - On or Powering Up
- Blue Blinking - Powering Up

Eth Link

- Blue - Link Up
- Blue Blinking - Link Up + Traffic Present

WiFi

- Off - Bridge Mode Unlinked or Non-FRC Firmware
- Red - AP Mode Unlinked
- Yellow\Orange - AP Mode Linked
- Green - Bridge Mode Linked

Power Distribution Panel



LED Fault Table

LED	Strobe	Slow	Long
Green	No Fault - Robot Enabled	No Fault - Robot Disabled	NA
Orange	NA	Sticky Fault	NA
Red	NA	No CAN Comm	NA

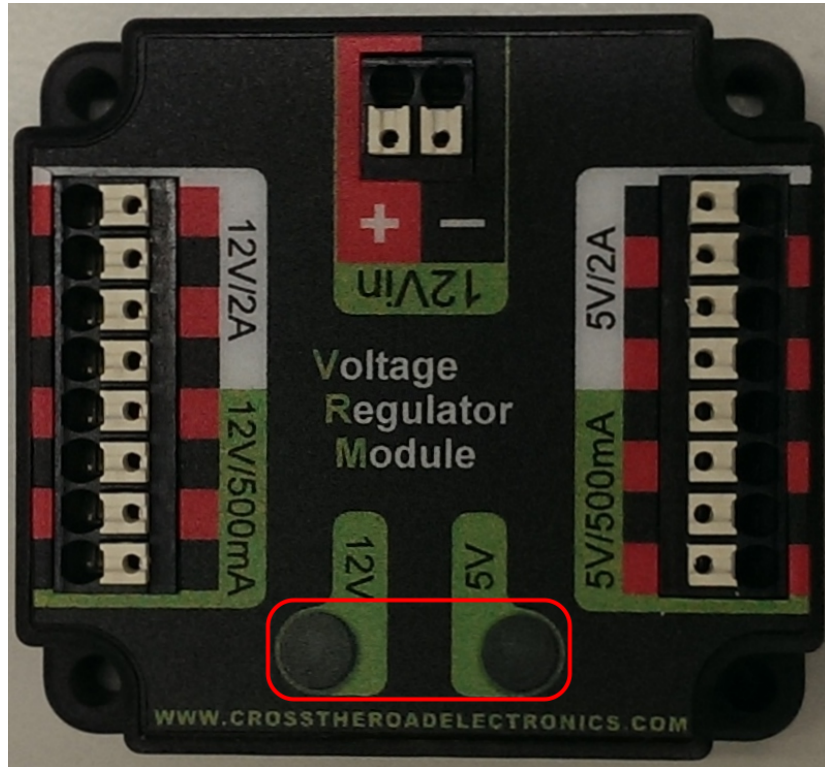
*If PCM LED contains more than one color, see LED Special States Table

LED Special States Table

LED Colors	Problem
Red/ Orange	Damaged Hardware
Green/ Orange	In Bootloader
No LED	No Power / Incorrect Polarity

Status Light Quick Reference

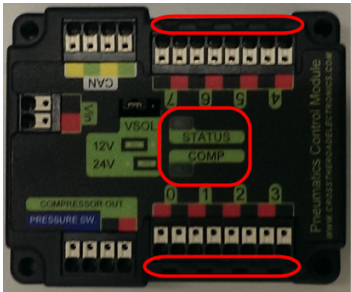
Voltage Regulator Module



The status LEDs on the VRM indicate the state of the two power supplies. If the supply is functioning properly the LED should be lit bright green. If the LED is not lit or is dim, the output may be shorted or drawing too much current.

Status Light Quick Reference

Pneumatics Control Module



LED Fault Table

LED	Strobe	Slow	Long
Green	No Fault - Robot Enabled	No Fault - Robot Disabled	NA
Orange	NA	Sticky Fault	NA
Red	NA	No CAN Comm OR Solenoid Fault (Blinks Solenoid Index)	Compressor Fault

*If PCM LED contains more than one color, see LED Special States Table

LED Special States Table

LED Colors	Problem
Red/ Orange	Damaged Hardware
Green/ Orange	In Bootloader
No LED	No Power / Incorrect Polarity

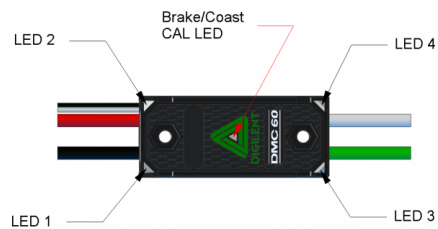
Solenoid Channel LEDs - These LEDs are lit red if the Solenoid channel is enabled and not lit if it is disabled.

Comp - This is the Compressor LED. This LED is green when the compressor output is active (compressor is currently on) and off when the compressor output is not active.

Status - The status LED indicates device status as indicated by the two tables above. For more information on resolving PCM faults see the PCM User Manual. Note that the No CAN Comm fault will not occur only if the device cannot see communicate with any other device, if the PCM and PDP can communicate with each other, but not the roboRIO you will NOT see a No Can Comm fault.

Status Light Quick Reference

Digilent DMC-60



At power-on the RGB LEDs will display a progressive blue color, which continually gets brighter. This lasts for approximately five seconds. During this time the motor controller will not respond to an input signal, nor will the output drivers be enabled. After the initial power-on has completed the device will begin normal operation and what gets displayed on the RGB LEDs will be a function of the input signal being applied, as well as the current fault state. Assuming that no faults have occurred the RGB LEDs will function as follows:

Servo Input Signal Applied	LED State
No input signal or invalid input pulse width	Alternate between top (LED1 and LED2) and bottom (LED3 and LED4) LEDs being on and off. When on, the LEDs display color is orange.
Neutral input pulse width	All 4 LEDs on solid orange
Positive input pulse width	LEDs blink green in a clockwise circular pattern (LED1→LED2→LED3→LED4→LED1). The rate at which the LEDs update is proportional to the duty cycle of the output and increases with increased duty cycle. At 100% duty cycle, all four LEDs turn on solid green.
Negative input pulse width	LEDs blink red in a counter-clockwise circular pattern (LED1→LED4→LED3→LED2→LED1). The rate at which the LEDs update is proportional to the duty cycle of the output and increases with increased duty cycle. At 100% duty cycle, all four LEDs turn on solid red.

9 Fault Indicators

When a fault condition is detected the output duty cycle is reduced to 0% and a fault is signaled. The output will remain disabled for 3 seconds. During this time the onboard LEDs (LED1, LED2, LED3, and LED4) are used to indicate the fault condition. The fault condition is indicated by toggling between the top (LED1 and LED2) and bottom (LED3 and LED4) LEDs being on and off. The top LEDs will be Red during them on state. The color of the bottom LEDs depends on which faults are presently active. The table below describes how the color of the bottom LEDs maps to the presently active faults.

Color	Over Temperature	Under Voltage
Green	✓	X
Blue	X	✓
Cyan/Aqua	✓	✓

When the center LED is off the device is operating in coast mode. When the center LED is illuminated the device is operating in brake mode. The Brake/Coast mode can be toggled by pressing down on the center of the triangle and then releasing the button.

Status Light Quick Reference

Jaguar speed controllers

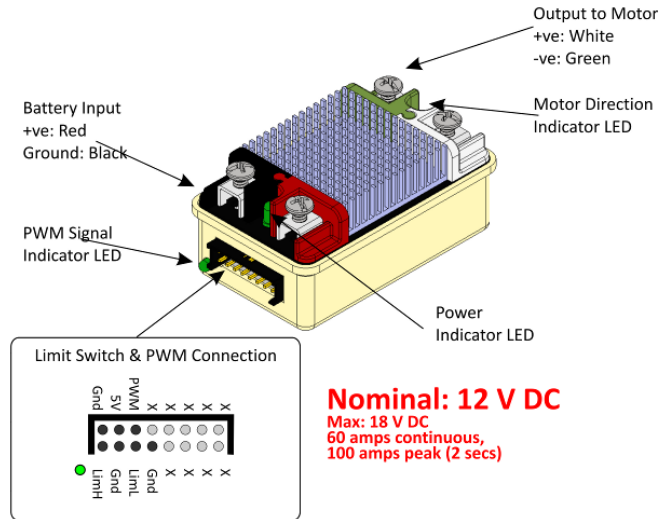


LED State	Module Status
Normal Operating Conditions	
Solid Yellow	Neutral (speed set to 0)
Fast Flashing Green	Forward
Fast Flashing Red	Reverse
Solid Green	Full-speed forward
Solid Red	Full-speed reverse
Fault Conditions	
Slow Flashing Yellow	Loss of servo or Network link
Fast Flashing Yellow	Invalid CAN ID
Slow Flashing Red	Voltage, Temperature, or Limit Switch fault condition
Slow Flashing Red and Yellow	Current fault condition

LED State	Module Status
Calibration Conditions	
Fast Flashing Red and Green	Calibration mode active
Fast Flashing Red and Yellow	Calibration mode failure
Slow Flashing Green and Yellow	Calibration mode success
Slow Flashing Red and Green	Calibration mode reset to factory default settings success
Other Conditions	
Slow Flashing Green	Waiting in CAN Assignment mode

Status Light Quick Reference

Mindsensors SD 540



Power LED

This LED will turn Red when Power is supplied.

Motor LED

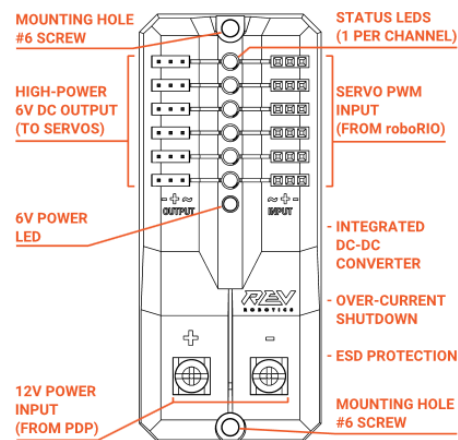
This LED turns Red in Forward direction and Green in Reverse direction.

PWM Signal LED

This LED turns Red when no valid PWM signal is detected, and turns Green when valid PWM signal is detected.

Status Light Quick Reference

REV Robotics Servo Power Module



STATUS LEDs

Each channel has a corresponding status LED that will indicate the sensed state of the connected PWM signal. The table below describes each state's corresponding LED pattern.

State	Pattern
No Signal	Blinking Amber
Left/Reverse Signal	Solid Red
Center/Neutral Signal	Solid Amber
Right/Forward Signal	Solid Green

6V Power LED off, dim or flickering with power applied = Over-current shutdown

Status Light Quick Reference

REV Robotics SPARK

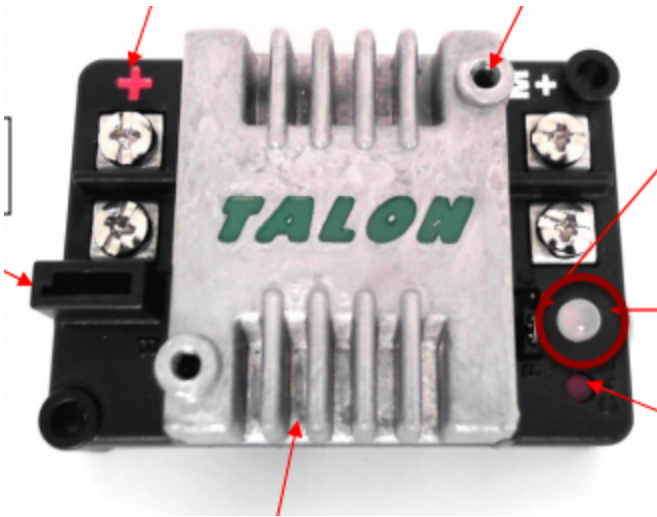
2.6 STATUS LED

The SPARK can display information about its current mode of operation via its tri-colored STATUS LED. The STATUS LED is located next to the motor output terminals and is labeled as STATUS with raised lettering on the SPARK housing.

Figure 2-6 shows the status codes associated with each operating state of the SPARK.

		LED Status Code	
Time Scale		1 second	1 second
State		Normal Operation	
No Signal	Brake	[Blue][Black][Blue][Black][Blue][Black][Blue][Black]	
	Coast	[Yellow][Black][Yellow][Black][Yellow][Black][Yellow][Black]	
Full Forward		[Green][Green][Green][Green][Green][Green][Green][Green]	
Proportional Forward		[Green][Black][Green][Black][Green][Black][Green][Black]	
Neutral	Brake	[Blue][Blue][Blue][Blue][Blue][Blue][Blue][Blue]	
	Coast	[Yellow][Yellow][Yellow][Yellow][Yellow][Yellow][Yellow][Yellow]	
Proportional Reverse		[Red][Black][Red][Black][Red][Black][Red][Black]	
Full Reverse		[Red][Red][Red][Red][Red][Red][Red][Red]	
Forward Limit Tripped		[Green][Black][Green][Black][Green][Black][Green][Black]	
Reverse Limit Tripped		[Red][Black][Red][Black][Red][Black][Red][Black]	
		Calibration	
Calibration Mode		[Black][Black][Black][Black][Black][Black][Black][Black]	
Successful Calibration		[Green][Black][Green][Black][Green][Black][Green][Black]	
Failed Calibration		[Red][Black][Red][Black][Red][Black][Red][Black]	
		Factory Reset	
		Mode button held during power up	Mode button released
Reset to Factory Defaults			[Green][Green][Green][Green][Green][Green][Green][Green]

Talon speed controllers



The LED is used to indicate the direction and percentage of throttle and state of calibration. The LED may be one of three colors; red, orange or green. A solid green LED indicates positive output

Status Light Quick Reference

voltage equal to the input voltage of the Talon. A solid Red LED indicates an output voltage that is equal to the input voltage multiplied by -1(input voltage = 12 volts, output equals -12 volts). The LED will blink it's corresponding color for any throttle less than 100% (red indicates negative polarity, green indicates positive). The rate at which the led blinks is proportional to the percent throttle. The faster the LED blinks the closer the output is to 100% in either polarity.

The LED will blink orange any time the Talon is in the disabled state. This will happen if the PWM input signal is lost, or in FRC, when the robot is disabled. If the Talon is in the enabled state and the throttle is within the 4% dead band, the LED will remain solid orange.

Flashing Red/Green indicate ready for calibration. Several green flashes indicates successful calibration, and red several times indicates unsuccessful calibration.

Victor speed controllers



LED Indicator Status:

Green - full forward

Orange - neutral / brake

Red - full reverse

Flashing orange - no PWM signal

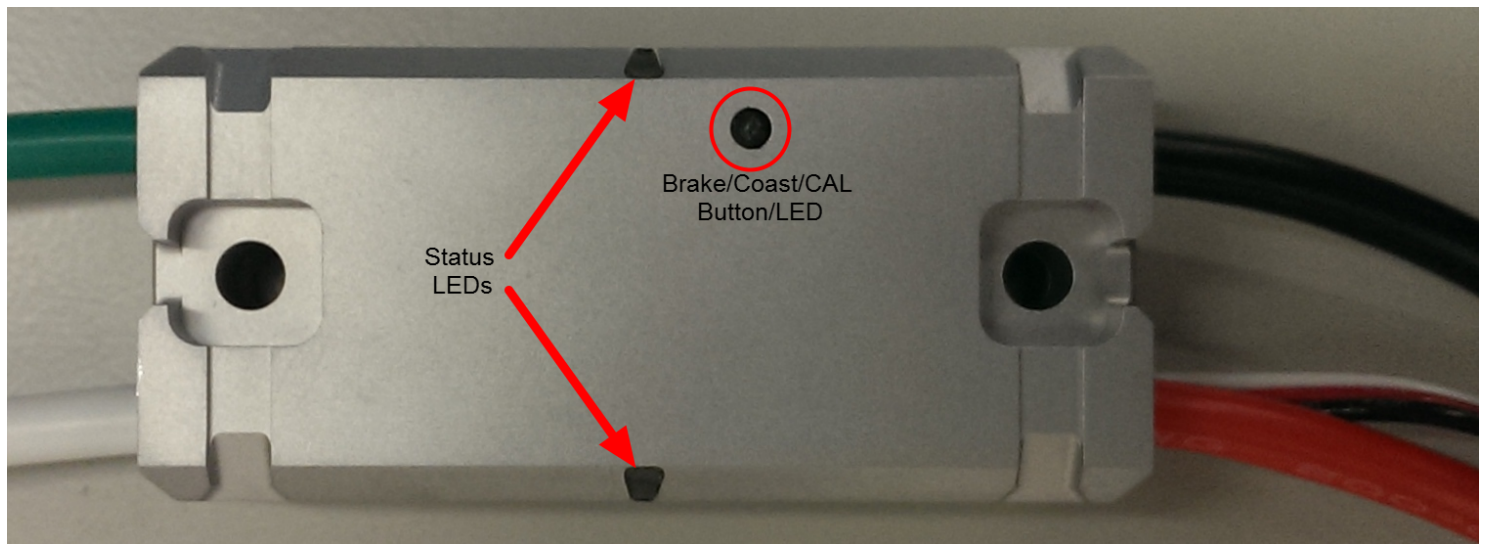
Flashing red/green - calibration mode

Status Light Quick Reference

Flashing green - successful calibration

Flashing red - unsuccessful calibration

Victor-SP speed controllers



Brake/Coast/Cal Button/LED - Red if the controller is in brake mode, off if the controller is in coast mode

Status

The Status LEDs are used to indicate the direction and percentage of throttle and state of calibration. The LEDs may be one of three colors; red, orange or green. Solid green LEDs indicate positive output voltage equal to the input voltage of the Victor-SP. Solid Red LEDs indicate an output voltage that is equal to the input voltage multiplied by -1(input voltage = 12 volts, output equals -12 volts). The LEDs will blink in the corresponding color for any throttle less than 100% (red indicates negative polarity, green indicates positive). The rate at which the LEDs blink is proportional to the percent throttle. The faster the LEDs blink the closer the output is to 100% in either polarity.

The LEDs will blink orange any time the Victor-SP is in the disabled state. This will happen if the PWM input signal is lost, or in FRC, when the robot is disabled. If the Victor-SP is in the enabled state and the throttle is within the 4% dead band, the LED will remain solid orange.

Flashing Red/Green indicate ready for calibration. Several green flashes indicates successful calibration, and red several times indicates unsuccessful calibration.

Status Light Quick Reference

Talon-SRX speed controllers

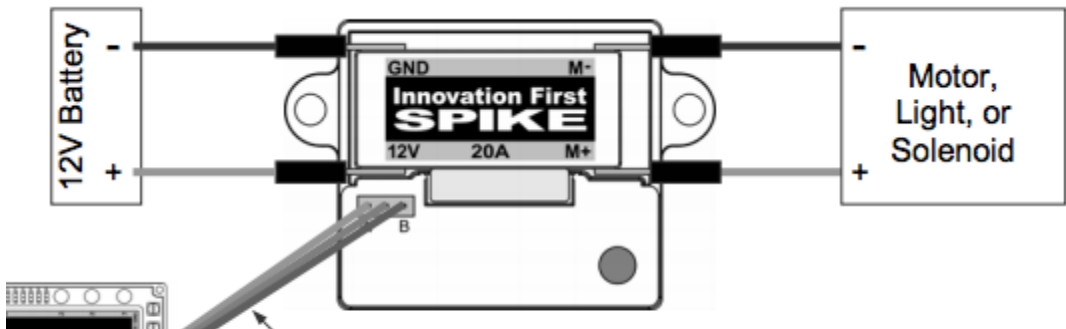
Blink Codes During Calibration	
Status LEDs Blink Code	Talon SRX State
Flashing Red/Green	Calibration Mode
Blinking Green	Successful Calibration
Blinking Red	Failed Calibration

Blink Codes During Normal Operation		
LEDs	Colors	Talon SRX State
Both	Blinking Green	Forward throttle is applied. Blink rate is proportional to Duty Cycle
Both	Blinking Red	Reverse throttle is applied. Blink rate is proportional to Duty Cycle
None	None	No Power is being applied to Talon SRX
LEDs Alternate ¹	Off/Orange	CAN bus detected, robot disabled
LEDs Alternate ¹	Off/Slow Red	CAN bus/PWM is not detected
LEDs Alternate ¹	Off/Fast Red	Fault Detected
LEDs Alternate ¹	Red/Orange	Damaged Hardware
LEDs Strobe "towards" (M+) ²	Off/Red	Forward Limit Switch or Forward Soft Limit
LEDs Strobe "towards" (M-) ²	Off/Red	Reverse Limit Switch or Reverse Soft Limit
LED1 Only "closest" to M+/V+	Green/Orange	In Boot-loader

B/C CAL Blink Codes	
B/C CAL Button Color	Talon SRX State
Solid Red	Brake Mode
Off	Coast Mode

Status Light Quick Reference

Spike relay configured as a motor, light, or solenoid switch



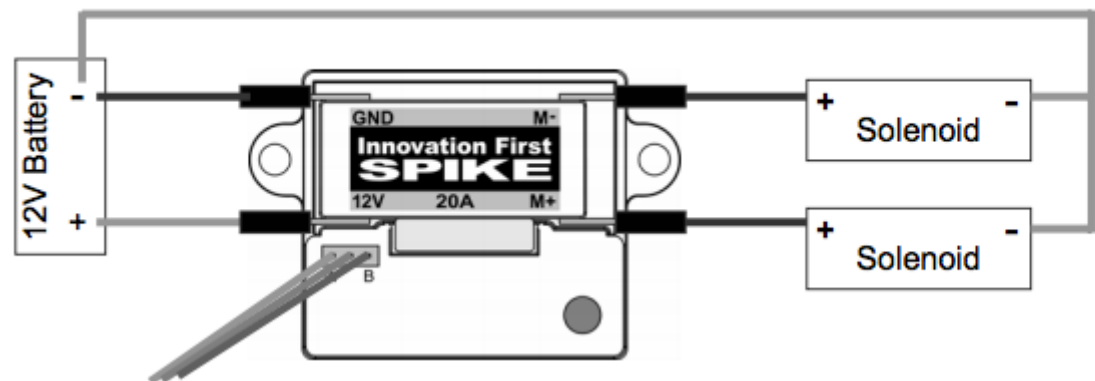
INPUTS		OUTPUTS		Indicator	Motor Function
Fwd(Wht)	Rev(Red)	M+	M-		
0	0	GND	GND	Orange	OFF / Brake Condition (default)
1	0	+12v	GND	Green	Motor rotates in one direction
0	1	GND	+12v	Red	Motor rotates in opposite direction
1	1	+12v	+12v	Off	OFF / Brake Condition

Notes:

1. 'Brake' refers to the dynamic stopping of the motor due to the shorting of the motor inputs. This condition is not optional when going to an off state.
2. The INPUT Fwd and Rev are defined as follows: 0 (Off) and 1 (On).

Status Light Quick Reference

Spike relay configured as for one or two solenoids



INPUT		OUTPUTS			
Fwd(Wht)	Rev(Red)	M+	M-	Indicator	Solenoid Function
0	0	GND	GND	Orange	Both Solenoids OFF (default)
1	0	+12v	GND	Green	Solenoid connected to M+ is ON
0	1	GND	+12v	Red	Solenoid connected to M- is ON
1	1	+12v	+12v	Off	Both Solenoids ON

Note:

1. The INPUT Fwd and Rev are defined as follows: 0 (Off) and 1 (On).