



VelinonTM
EXTREME BRUSHLESS POWER SYSTEM

OWNER'S MANUAL

PART #3350X

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BEFORE YOU PROCEED

Carefully read and follow all instructions in this and any accompanying materials to prevent serious damage to your system. Failure to follow these instructions will be considered abuse and/or neglect.

Before using your system, look over this entire manual and examine the system carefully. If for some reason you decide it is not what you wanted, then do not continue any further. **Your hobby dealer absolutely cannot accept a system for return or exchange after it has been used.**

SUPPORT

If you have any questions about your system or its operation, call the Traxxas Technical Support line toll-free at: **1-888-TRAXXAS (1-888-872-9927)***.

Technical support is available Monday through Friday from 8:30am to 9:00pm central time. Technical assistance is also available at www.Traxxas.com/support. You may also e-mail customer support with your question at support@Traxxas.com. Join thousands of registered members in our online community at Traxxas.com.

Traxxas offers a full-service, on-site repair facility to handle any of your Traxxas service needs. Maintenance and replacement parts may be purchased directly from Traxxas by phone or online at BuyTraxxas.com. You can save time, along with shipping and handling costs, by purchasing replacement parts from your local dealer.

Do not hesitate to contact us with any of your product support needs. We want you to be thoroughly satisfied with your new system!

SAFETY PRECAUTIONS

VXL-3s Electronic Speed Control

- **Water and Electronics Do Not Mix:** Your VXL-3s brushless power system is waterproof for use in mud, snow, puddles and other wet conditions. Make certain the other components of your model are waterproof or have sufficient water resistance before driving in wet conditions.
- **Disconnect the Batteries:** Always disconnect the battery pack from the speed control when not in use.
- **Transmitter on First:** Switch on your transmitter first before switching on the speed control to prevent runaways and erratic performance.
- **Don't Get Burned:** The heat sink can get extremely hot, so be careful not to touch it until it is cool. Supply adequate airflow for cooling.
- **Use Stock Connectors:** If you decide to change the battery or motor connectors, only change one battery or motor connector at a time. This will prevent damage from accidentally mis-wiring the speed control. Please note that modified speed controls can be subject to a rewiring fee when returned for service. Removing the battery connector on the speed control or using the same-gender connectors on the speed control will void the product's warranty.

- **Insulate the Wires:** Always insulate exposed or damaged wiring with heat shrink tubing to prevent short circuits.

Batteries and Battery Charging

The Velineon Power System uses rechargeable batteries that must be handled with care for safety and long battery life. Make sure to read and follow all instructions and precautions that were provided with your battery packs and your charger. It is your responsibility to charge and care for your battery packs properly. In addition to your battery and charger instructions, here are some more tips to keep in mind.

- Never leave batteries to charge unattended.
- Remove the batteries from the model while charging.
- Allow the battery packs to cool off between runs (before charging).
- Always unplug the battery from the electronic speed control when the model is not in use and when it is being stored or transported.
- Do not use battery packs that have been damaged in any way.
- Do not use battery packs that have damaged wiring, exposed wiring, or a damaged connector.
- Children should have responsible adult supervision when charging and handling batteries.

LiPo Batteries

Lithium Polymer (LiPo) batteries are becoming popular for use in R/C models due to their compact size, high energy density, and high-current output. However, these types of batteries require special care and handling procedures for long life and safe operation. **Warning:** LiPo batteries are intended only for advanced users that are educated on the risks associated with LiPo battery use. **Traxxas does not recommend that anyone under the age of 16 use or handle LiPo battery packs without the supervision of a knowledgeable and responsible adult.**

The VXL-3s electronic speed control is able to use LiPo batteries with nominal voltage not to exceed 11.1 volts (3S packs) volts. LiPo batteries have a minimum safe discharge voltage threshold that should not be exceeded. The Velineon VXL-3s electronic speed control is equipped with built-in Low-Voltage Detection that alerts the driver when LiPo batteries have reached their minimum voltage (discharge) threshold. **It is the driver's responsibility to stop immediately to prevent the battery pack from being discharged below its safe minimum threshold.**

Low-Voltage Detection on the speed control is just one part of a comprehensive plan for safe LiPo battery use.

It is critical for you, the user, to follow all other instructions

supplied by the battery manufacturer and the charger manufacturer for proper charging, use, and storage of LiPo batteries. Make sure you understand how to use your LiPo batteries. Be aware that Traxxas shall not be liable for any special, indirect, incidental, or consequential damages arising out of the installation and/or use of LiPo batteries in Traxxas products.

If you have questions about LiPo battery usage, please consult with your local hobby dealer or contact the battery manufacturer.

INTRODUCTION

Thank you for purchasing the new Velineon™ Brushless Power System. The Velineon Power System lets you experience the best that brushless motor technology has to offer. Incredible speed, efficient operation, long run times, and low-maintenance operation are just some of the benefits. We are confident you will be rewarded with high-speed performance in a durable, long-lasting product.

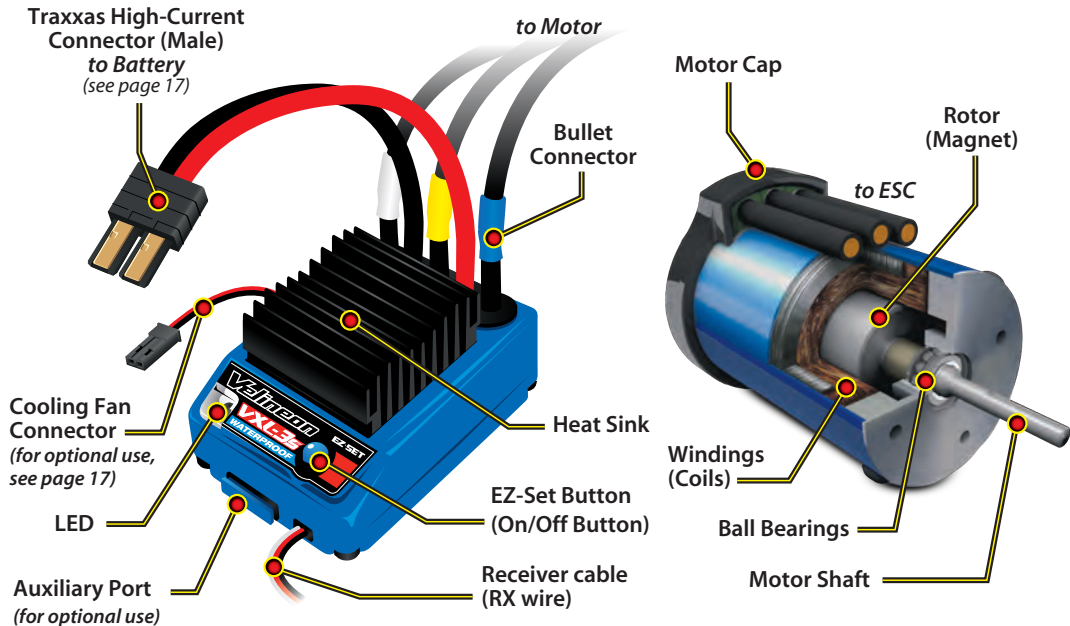
This manual contains the instructions you will need to operate, and maintain your system. We want you to feel confident that you own one of the best-performing products in the market and that it is backed by a team of professionals who aim to provide the highest level of factory support possible. Traxxas products are about experiencing total performance and satisfaction, not just with your system, but also with the company that stands behind it.

We know you're excited about getting your new system installed, but it's very important that you take some time to read through the Owner's Manual. This manual contains all the necessary set-up and operating procedures that will allow you to unlock the performance potential that Traxxas engineers designed into your system. Also be sure to read and follow the precautions and warnings in this manual and on any labels or tags attached to your system. They are there to educate you on how to operate your system safely and also get maximum life and performance from your system.

Even if you are an experienced R/C enthusiast, it's important to read and follow the procedures in this manual.

Thank you again for going with Traxxas. We work hard every day to assure you receive the highest level of customer satisfaction possible. We truly want you to enjoy your new system!

ANATOMY OF THE VXL-3S AND VE LINEON 3500



TERMINOLOGY

Please take a moment to familiarize yourself with these terms. They will be used throughout this manual.

Brushless Motor - A D/C brushless motor replaces the brushed motor's traditional commutator and brush arrangement with intelligent electronics that energize the electromagnetic windings in sequence to provide rotation. Opposite of a brushed motor, the brushless motor has its windings (coils) on the perimeter of the motor can and the magnets are mounted to the spinning rotor shaft.

Cogging - Cogging is a condition sometimes associated with brushless motors. Typically it is a slight stutter noticed when accelerating from a stop. It happens for a very short period as the signals from the electronic speed control and the motor synch with each other. The VXL-3s electronic speed control is optimized to virtually eliminate cogging.

Current - Current is a measure of power flow through the electronics, usually measured in amps. If you look at wire like a garden hose, current is a measure of how much water is flowing through the hose.

ESC (Electronic Speed Control) - An electronic speed control is the electronic motor control inside the model. The VXL-3s electronic speed control uses

advanced circuitry to provide precise, digital proportional throttle control. Electronic speed controls use power more efficiently than mechanical speed controls so that the batteries run longer. An electronic speed control also has circuitry that prevents loss of steering and throttle control as the batteries lose their charge.

kV Rating - Brushless motors are often rated by their kV number. The kV rating equals no-load motor rpm with 1 volt applied. The kV increases as the number of wire turns in the motor decreases. As the kV increases, the current draw through the electronics also increases. The Velineon 3500 motor is a 10-turn, 3500 kV motor optimized for the best speed and efficiency in lightweight 1/10 scale models.

LiPo - Abbreviation for Lithium Polymer. Rechargeable LiPo battery packs are known for their special chemistry that allows extremely high energy density and current handling in a compact size. These are high performance batteries that require special care and handling. For advanced users only.

mAh - Abbreviation for milliamp hour. A measure of the capacity of the battery pack. The higher the number, the longer the battery will last between recharges.

NiMH - Abbreviation for nickel-metal hydride.

Rechargeable NiMH batteries offer high current handling, and much greater resistance to the “memory” effect. NiMH batteries generally allow higher capacity than NiCad batteries. They can last up to 500 charge cycles. A peak charger designed for NiMH batteries is required for optimal performance.

Resistance - In an electrical sense, resistance is a measure of how an object resists or obstructs the flow of current through it. When flow is constricted, energy is converted to heat and is lost. The Velineon power system is optimized to reduce electrical resistance and the resulting power-robbing heat.

Rotor - The rotor is the main shaft of the brushless motor. In a brushless motor, the magnets are mounted to the rotor, and the electromagnetic windings are built into the motor housing.

Sensored - Sensored refers to a type of brushless motor that uses an internal sensor in the motor to communicate rotor position information back to the electronic speed control. The VXL-3s electronic speed control is able to use sensed motors when applications benefit from them (such as some sanctioned racing classes).

Sensorless - Sensorless refers to a brushless motor that uses advanced instructions from an electronic speed control to provide smooth operation. Additional motor sensors and wiring are not required. The VXL-3s electronic speed control is optimized for smooth sensorless control.

Solder Tabs - Accessible, external contacts on the motor that allows for easy wire replacement. The Velineon 3500 is equipped with solder tabs.

Thermal Shutdown Protection - Temperature sensing electronics used in the VXL-3s electronic speed control detect overloading and overheating of the transistor circuitry. If excessive temperature is detected, the unit automatically shuts down to prevent damage to the electronics.

Voltage - Voltage is a measure of the electrical potential difference between two points, such as between the positive battery terminal and ground. Using the analogy of the garden hose, while current is the quantity of water flow in the hose, voltage corresponds to the pressure that is forcing the water through the hose.

VELINEON SYSTEM SPECIFICATIONS

VXL-3s Specifications:

Input voltage: 4.8 - 11.1V (4 - 9 cells NiMH or 2S - 3S LiPo)

Supported motors: Brushed / Brushless / Sensorless brushless

Motor limit: None

Continuous current: 200A

Peak current: 320A

BEC voltage: 6.0V DC

Transistor type: MOSFET

On-resistance: 0.00075 Ω Max (0.006/8 FETs)

PWM frequency: 12,000Hz

Battery connector: Traxxas High-Current Connector

Motor connectors: TRX 3.5mm bullet connectors

Motor/battery wiring: 12-gauge Maxx[®] Cable

Thermal protection: 2-stage thermal shutdown

Case size (l/w/h): 55mm (2.19")/ 39mm (1.54")/ 33mm (1.3")

Weight: 109g (3.84oz)

VXL-3s Profile Selection:

Profile #1 (Sport Mode): 100% Forward, 100% Brakes, 100% Reverse

Profile #2 (Race Mode): 100% Forward, 100% Brakes, No Reverse

Profile #3 (Training Mode): 50% Forward, 100% Brakes, 50% Reverse

Velineon 3500 Specifications:

Type: Sensorless brushless

RPM/volt: 3500 (10-turn)

Magnet type: Ultra High-Temperature
Sintered Neodymium

Connection type: TRX 3.5mm bullet connectors

Wire size: 12-gauge Maxx[®] Cable w/ solder tabs

Current Ratings: 65A constant; 100A peak/burst

Max RPM: 50,000

Diameter: 36mm (1.42") (540 size)

Length: 55mm (2.165")

Weight: 262g (9.24oz)

VELINEON SYSTEM INSTALLATION

The following instructions cover installation of the Velineon System in an XL-5 equipped Rustler, Bandit, Stampede, or Slash.



If your vehicle included a **YELLOW XL-5 speed control as stock equipment**, be aware that your model does NOT have waterproof electronics. Although the Velineon system is waterproof, operating your model in mud, water, or snow will damage your vehicle's servo and receiver. **Do NOT operate your model in wet conditions.**

The Velineon System is capable of extreme power, and the drivetrain upgrades below are recommended to increase the performance and durability of the XL-5 equipped model being upgraded to Velineon Power. All of the items listed as "Minimum recommended upgrades" should be added to your model.

Minimum recommended Yellow XL-5 equipped vehicle component upgrades:

- 2381X Main diff with steel ring gear/ side cover plate/ screws (Bandit, Stampede, Rustler)
- 2753X Stub axles, rear (2)
- 4628R Differential output yokes, black (2)/ 3x5mm countersunk screws (2)/ screw pin (2)
- 3696 Idler gear, steel (30-tooth)

Additional suggested Yellow XL-5 equipped vehicle component upgrades:

- 3647 Nuts, 4mm flanged nylon locking (steel, serrated) (8)
- 3752 Stub axle carriers (2) (requires 5x11x4mm bearings)
- 3736 Steering blocks, left & right (2) (requires 5x11x4mm bearings)
- 5116 Ball bearings, blue rubber sealed (5x11x4mm) (2)



If your vehicle included a **BLUE XL-5 speed control as stock equipment**, this indicates that your vehicle has waterproof electronics, and you may operate your vehicle in mud, water, and snow after you have installed your waterproof Velineon brushless speed control and motor system. Make certain batteries and other components of your model are waterproof or have sufficient water resistance before driving in wet conditions. Follow all maintenance steps outlined in your vehicle manual after running your vehicle in wet conditions.

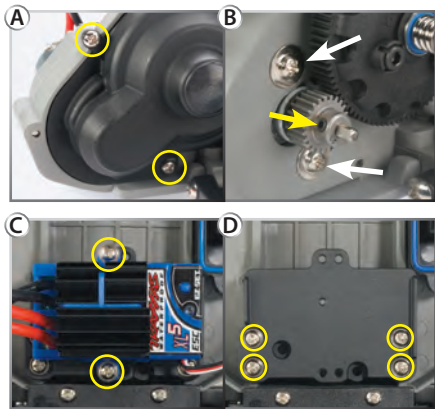
Models originally equipped with a BLUE XL-5 speed control are Brushless Ready and feature all of the items shown above as standard equipment, except Part #5516 ball bearings. The items do not need to be purchased for your model, but Part #5516 ball bearings remain a suggested upgrade.

The following instructions show installation in a waterproof (blue XL-5 ESC) model. If your model has a yellow XL-5 ESC, simply skip the steps that mention the waterproof receiver box.

Removing the XL-5 system

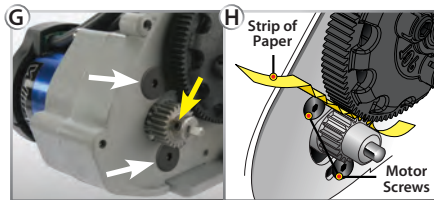
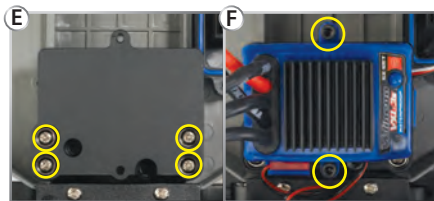
1. Remove the right rear wheel (passenger rear).
2. Remove the two 3x6mm screws from the gear cover and remove the gear cover (A).
3. Loosen the motor pinion gear set screw (B, *yellow arrow*) and slide the gear off the motor shaft. Disconnect the motor wires and loosen the two 3x8mm washerhead screws until the motor is free of the gearbox (B). Remove the motor.
4. On the waterproof receiver box, remove the wire clamp by removing the two 2.5x10mm cap screws.
5. Remove the waterproof receiver box cover by removing the two 3x10mm cap screws.
6. Remove the speed control's XL-5 plug from Channel 2 of your receiver (see *wiring diagram, page 15*).
7. Remove the two 3x12mm washerhead screws that hold the XL-5 to its mount (C). Remove the XL-5.
8. **Rustler and Bandit:** Remove the four 3x8mm washerhead screws from the ESC mount. Remove the mount and discard (D).
Stampede: The stock ESC mount will be reused. Proceed to step 2 of *Installation of the Velineon System*.
Slash: The Slash chassis has mounting holes for the Velineon System. Proceed to step 2 of *Installation of the Velineon System*.

Screw Options Note: Other than the 3x15mm cap screws for mounting the ESC to the model plate, all the original hardware on your model can be reused. 3x8mm flathead hex screws are included if you wish to upgrade your motor screws to hex hardware.

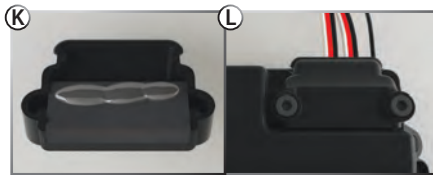


Installation of the Velineon System:

1. **Rustler and Bandit:** Install the included ESC mounting plate using the 3x8mm screws (E).
2. **Rustler, Bandit, Stampede:** Mount the VXL-3s to the mounting plate using the supplied 3x15mm cap screws (F).
Slash: Mount the VXL-3s directly to the chassis using the supplied 3x15mm cap screws.
3. Mount the Velineon Motor to the gearbox using the 3x8mm washerhead screws (or the included flathead hex screws) and tighten finger tight (G, *white arrows*).
4. Mount the motor pinion to the motor shaft, make sure to tighten set screw against the flat portion of the shaft (G, *yellow arrow*).
5. Set the gear mesh by running a narrow strip of notebook paper into the gear mesh. Loosen the motor screws and slide the motor and pinion gear into the spur gear. Tighten the motor screws and then remove the strip of paper (H).
6. Replace the gear dust cover and the wheel.
7. Connect the Velineon motor wires according to the wiring diagram (see page 14).
8. Plug ESC wires into the receiver (I). Bundle wiring as necessary.
9. Make sure the O-ring is properly seated into the groove in the waterproof receiver box bottom so that the cover will not pinch it or damage it in any way.

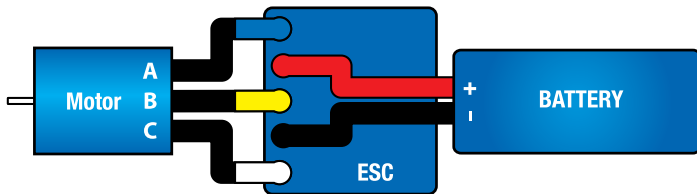


10. Place waterproof receiver box top onto waterproof receiver box bottom and install and tighten the two 3x10mm cap screws securely.
11. Inspect the waterproof box cover to make sure that the O-ring seal is not visible.
12. Arrange the wires neatly using the wire guides on the waterproof receiver box top (J). Excess ESC and servo wiring should be bundled inside the waterproof receiver box. Pull out all available antenna wiring from the waterproof receiver box.
13. Apply a small bead of silicone grease (Part # 1647) to the foam on the waterproof receiver box wire clamp (K).
14. Install the waterproof receiver box wire clamp and tighten the two 2.5x10mm cap screws securely (L).
15. See page 18 for VXL-3s setup and operation.

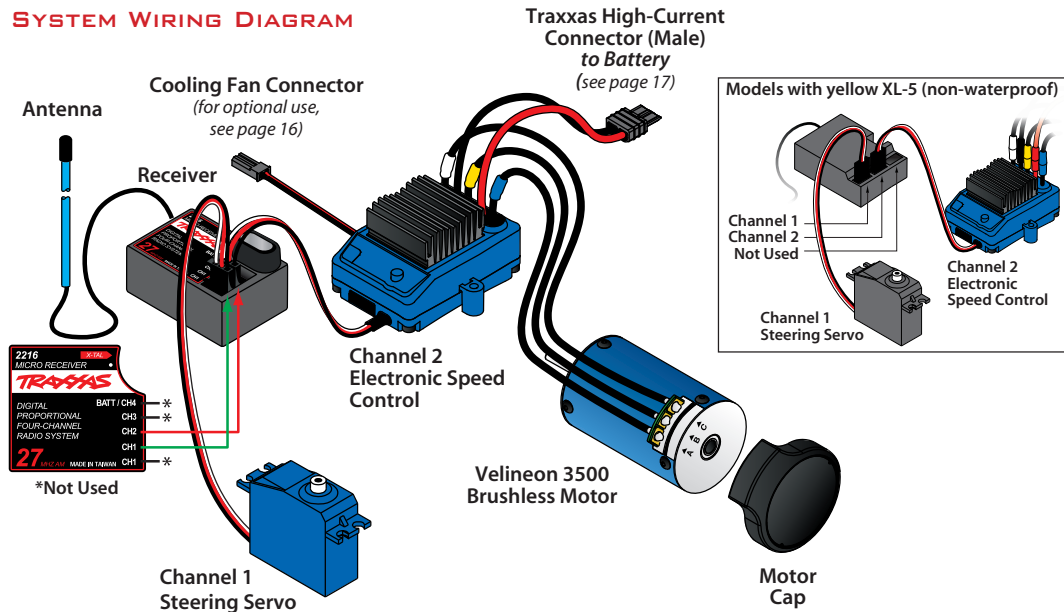


MOTOR WIRING DIAGRAM

- + Positive
- Negative
- A (Blue)
- B (Yellow)
- C (White)



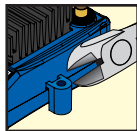
SYSTEM WIRING DIAGRAM



INSTALLING THE VELINEON SYSTEM IN OTHER MODELS

Some users may wish to experience the power of the Velineon Brushless Power System in other applications. Here are some tips:

- The VXL-3s does not use a conventional on/off switch. Pressing the EZ-Set button on the speed control turns it on and off. It is not necessary to install an on/off switch into the wiring harness.
- Mount the speed control so that none of the power components (wiring, motor, ESC) contacts any part of the radio system, particularly the antenna wire. The receiver should be mounted so the antenna wire can be extended as far away from the speed control as possible. The antenna wire should be extended vertically in the mast and not wrapped on the chassis under the body. Excess antenna wire should not be coiled on the chassis. Servo cables and the antenna wire should not cross or come in contact with any of the motor or battery wires. These steps will help reduce the possibility of radio interference.
- If you are planning to operate the system at the higher limits of its capabilities, cut ventilation holes into the body for the heat sinks. Monitoring temperatures will extend the lives of the batteries and motors and proper ventilation and cooling will prevent premature thermal shutdown. See page 17 for accessories that will help you monitor temperatures and cool your components.
- Mount the speed control where it will be protected from crash damage. Also protect the speed control from dirt and debris kicked up by the tires.
- Mount the speed control where you will have easy access to the plugs and the on/off (EZ-Set) button without having to remove the body.
- Graphite or metal chassis have been known to transmit radio noise generated by the motor. If the receiver is to be mounted on the chassis, position it so the crystal and antenna are as far away from the chassis as possible. This may require you to mount the receiver on its side. This will reduce the chance of picking up radio interference from the motor.
- For installations without using the servo mounting plate, the VXL-3s can be installed with double-sided servo tape. The screw bosses may need to be cut from the case with a pair of side cutters to allow the VXL-3s to fit in non-Traxxas models. When mounting



the speed control with double-sided servo tape, clean both application surfaces thoroughly with alcohol. The surfaces must be perfectly clean for maximum adhesion.

TRAXXAS HIGH CURRENT CONNECTOR

Your system is equipped with the Traxxas High-Current Connector. Standard connectors restrict current flow and are not capable of delivering the power needed to maximize the output of the Velineon Brushless Power system.



The Traxxas connector's gold-plated terminals with a large contact surfaces ensure positive current flow with the least amount of resistance. Secure, long-lasting, and easy to grip, the Traxxas connector is engineered to extract all the power your battery has to give.

To run this system, your batteries must be equipped with Traxxas High-Current Connectors. Batteries can either be purchased new with Traxxas connectors installed or Traxxas connectors can be purchased to install on battery packs you already own. For best performance, your system requires NiMH battery packs that have cells rated for high discharge and use high-quality, low-resistance assembly techniques. Cheaply made battery packs do not retain their performance

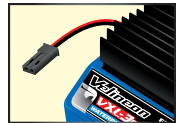
characteristics after repeated uses in high-powered electric applications. They will lose their punch and run time and may require frequent replacement. In addition, poor-quality, high-resistance cell connectors could fail, requiring disassembly and repair. The main goal is to reduce all sources of high resistance in the pack. This includes the connector, the wire, and the bars attaching the cells together. High pack resistance will create additional heat and rob you of the full power the cells are capable of producing.

VXL-3s ACCESSORIES

Temperature gauge - An on-board temperature gauge such as the Traxxas Part #4091 can aid you in monitoring your motor temperature. Generally, try to keep your motor below 200° F.



Heat sink cooling fan - The VXL-3s is equipped with an additional connector to supply power to an optional heat sink cooling fan (Traxxas Part# 3340). The optional heat sink cooling fan can assist in cooling the VXL-3s in high current motor applications.



VXL-3s SETUP AND OPERATION

Traxxas TQ Radio Systems

Before attempting to program your VXL-3s, it is important to make sure your TQ transmitter is properly adjusted (set back to the factory defaults). Otherwise, you may not get the best performance from your speed control.

The transmitter should be adjusted as follows:

1. Set the throttle neutral switch to the 50/50 setting.
This adjusts the transmitter's throttle trigger throw to 50% for throttle and 50% for braking and reverse. Experienced users may wish to use the 70/30 setting if more broad proportional control is desired in forward than with braking and reverse. This might be desirable in a racing environment where reverse is disabled.
2. Set the throttle trim control to the middle "0" setting.
3. Set the Channel 2 servo reversing switch to the left position. Do not change the position of any of the servo reversing switches after programming the VXL-3s.
4. You are now ready to program your speed control.

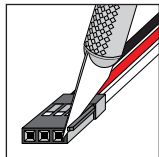
Aftermarket (Non-Traxxas) Transmitters

The following instructions are provided as a general reference only for those who are using non-Traxxas transmitters. Consult your transmitter's instructions for information on how to change the settings.

1. Set the High ATV (adjustable travel volume) or EPA (end point adjustment) to the maximum setting. This is the amount of servo throw at full throttle.
2. Set the Low ATV, EPA or ATL (low side only trim adjustment) to the maximum setting. This is the amount of servo throw at full brakes or reverse.
3. Set the throttle trim to the middle (neutral setting).
4. Set the throttle channel reversing switch to either position. Do not change the switch position after programming.
5. Set the trigger throw adjustment to 50% throttle and 50% brake (either mechanical or electronic).
6. Set the exponential setting (if equipped) to the zero or fully linear setting.

Aftermarket Receivers

The VXL-3s is compatible with most aftermarket receivers. By removing the tab on the edge of the power connector, the VXL-3s can be plugged directly into some models of Futaba®, Airtronics®, Hitec®, and JR® receivers. Please refer to the manufacturer's



wiring diagrams that came with your receiver. On the VXL-3s, the red wire is positive, the black wire is negative, and the white wire is the control wire. **Warning:** On some older Airtronics® radio systems, the positive and negative terminals are opposite of the VXL-3s and an adapter is required. Crossing the red (+) and black (-) wires could damage the receiver and the VXL-3s. Study the manufacturer's wiring diagrams closely, or consult your hobby dealer.

LOW-VOLTAGE DETECTION SETTING

The Velineon VXL-3s electronic speed control is equipped with built-in Low-Voltage Detection. The Low-Voltage Detection circuitry constantly monitors the battery voltage. When the battery voltage begins to reach the minimum recommended discharge voltage threshold for LiPo battery packs, the VXL-3s will limit the power output to 50% throttle. When the battery voltage attempts to fall below the minimum threshold, the VXL-3s will shut down all motor output. The LED on the speed control will slowly blink red, indicating a low-voltage shutdown. The VXL-3s will stay in this mode until a fully charged battery is connected.

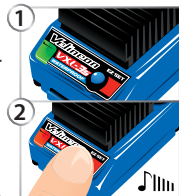
The electronic speed control is factory set with Low-Voltage Detection activated. Low-Voltage Detection should be disabled when using NiMH batteries. **Never use LiPo batteries while Low-Voltage Detection is disabled.**

Verify that Low-Voltage Detection is activated:

1. Turn on the transmitter (with the throttle at neutral).
2. Connect a fully charged battery pack to the VXL-3s.
3. Press and release the EZ-Set button to turn the VXL-3s on. If the LED is solid green, then Low-Voltage Detection is ACTIVATED. If the LED is solid red, then the Low-Voltage Detection is DISABLED (not safe to use LiPo batteries).

To disable Low-Voltage Detection (NiMH setting):

1. Make sure the LED on the VXL-3s is on and green.
2. Press and hold the EZ-Set button for ten seconds. The LED will turn off and then light red. Also, a "falling" musical tone will be emitted from the motor.
3. Low-Voltage Detection is now DISABLED.



To activate Low-Voltage Detection (LiPo setting):

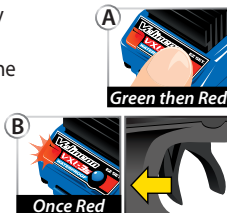
1. Make sure the LED on the VXL-3s is on and red.
2. Press and hold the EZ-Set button for ten seconds. The LED will turn off and then light green. Also, a "rising" musical tone will be emitted from the motor.
3. Low-Voltage Detection is now ACTIVATED.



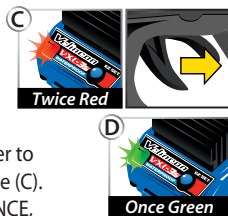
VXL-3s SETUP PROGRAMMING (Calibrating your ESC and transmitter)

Read through all of the programming steps before you begin. If you get lost during programming or receive unexpected results, simply unplug the battery, wait a few seconds, plug the battery back in, and start over.

1. Connect a fully charged battery pack to the VXL-3s.
2. Turn on the transmitter (with the throttle at neutral).
3. Press and hold the EZ-Set button (A). The LED will first turn green and then red. Release the EZ-Set button.



4. When the LED blinks RED ONCE. Pull the throttle trigger to the full throttle position and hold it there (B).
5. When the LED blinks RED TWICE. Push the throttle trigger to the full reverse and hold it there (C).
6. When the LED blinks GREEN ONCE, programming is complete. The LED will then shine green or red (depending on low-voltage detection setting) indicating the VXL-3s is on and at neutral (D).



VXL-3s OPERATION

To operate the speed control and test programming, place the vehicle on a stable block or stand so that all of the driven wheels are off the ground. Disconnect motor wires "A" and "C", this will assure the motor does not drive the wheels during testing. Do not test programming without disconnecting the motor wires. *Note that in steps 1-7 below, Low-Voltage Detection is ACTIVATED (factory default) and the LED shines green. If Low-Voltage Detection is DISABLED, the LED will shine red instead of green in steps 1-7 below.*

1. With the transmitter on, press and release the EZ-Set button. The LED will shine green. This turns the VXL-3s on.
2. Apply forward throttle. The LED will turn off until full throttle power is reached. At full throttle, the LED will illuminate green.
3. Move the trigger forward to apply the brakes. Note that braking control is fully proportional. The LED will turn off until full braking power is reached.
At full brakes, the LED will illuminate green.
4. Return the throttle trigger to neutral. The LED will shine green.
5. Move the throttle trigger forward again to engage reverse (Profile #1). The LED will turn off. Once full reverse power is reached, the LED will illuminate green.
6. Return the throttle trigger to neutral. (Note: There is programmed delay when changing from reverse to forward. This prevents damage to the transmission on high-traction surfaces.)
7. To turn the VXL-3s off, press the EZ-Set button until the LED turns off (.5 seconds).

*patent pending

VXL-3s PROFILE SELECTION

The speed control is factory set to Profile #1 (100% forward, brakes, and reverse). To disable reverse (Profile #2) or to allow 50% forward and 50% reverse (Profile #3), follow the steps below. The speed control should be connected to the receiver and battery, and the transmitter should be adjusted as described previously. The profiles are selected by entering the programming mode.

Profile Description

Profile #1 (Sport Mode):

100% Forward, 100% Brakes, 100% Reverse

Profile #2 (Race Mode):

100% Forward, 100% Brakes, No Reverse

Profile #3 (Training Mode*):

50% Forward, 100% Brakes, 50% Reverse

Selecting Sport Mode

(Profile #1: 100% Forward, 100% Brakes, 100% Reverse)

1. Connect a fully charged battery pack to the VXL-3s and turn on your transmitter.
2. With the VXL-3s off, press and hold the EZ-Set button until the LED turns solid green, then solid red and then begins blinking red (indicating the Profile #).



3. When the LED blinks red once, release the EZ-Set button.



4. The LED will blink and then turn solid green (Low-Voltage Detection ACTIVE) or red (Low-Voltage Detection DISABLED). The model is ready to drive.



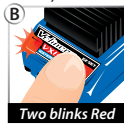
Selecting Race Mode

(Profile #2: 100% Forward, 100% Brakes, No Reverse)

1. Connect a fully charged battery pack to the VXL-3s and turn on your transmitter.



2. With the VXL-3s off, press and hold the EZ-Set button until the LED turns solid green, then solid red and then begins blinking red (indicating the Profile #).



3. When the LED blinks red twice, release the EZ-Set button.



4. The LED will blink and then turn solid green (Low-Voltage Detection ACTIVE) or red (Low-Voltage Detection DISABLED). The model is ready to drive.



Selecting Training Mode

(Profile #3: 50% Forward, 100% Brakes, 50% Reverse)

1. Connect a fully charged battery pack to the VXL-3s and turn on your transmitter.



2. With the VXL-3s off, press and hold the EZ-Set button until the LED turns solid green, then solid red and then begins blinking red (indicating the Profile #).



3. When the LED blinks red three times, release the EZ-Set button.









4. The LED will blink and then turn solid green (Low-Voltage Detection ACTIVE) or red (Low-Voltage Detection DISABLED). The model is ready to drive.



Note: If you missed the mode you wanted, keep the EZ-Set button pressed down and the blink cycle will repeat until the button is released and a Mode is selected.

VXL-3s LED CODES AND PROTECTION MODES

- 
 • **Solid Green:** VXL-3s power on light. Low-Voltage Detection is ON (LiPo setting).
- 
 • **Solid Red:** VXL-3s power on light. Low-Voltage Detection is OFF (NiCad/NiMH setting).
- 
 • **Fast Blinking Red:** Thermal Shutdown Protection Stage 1. If the motor has lower than normal power and the VXL-3s is hot, the VXL-3s has entered **Stage 1 Thermal Shutdown Protection** to guard against overheating caused by excessive current flow. If the motor has no power and the VXL-3s is very hot, the VXL-3s has entered **Stage 2 Thermal Shutdown Protection** and has automatically shut down. Let the VXL-3s cool. Make sure your model is properly geared for the conditions.
- 
 • **Slow Blinking Red** (with Low-Voltage Detection on): The VXL-3s has entered **Low-Voltage Protection**. When the battery voltage begins to reach the minimum recommended discharge voltage threshold for LiPo battery packs, the VXL-3s will limit the power output to 50% throttle. When the battery voltage attempts to fall below the minimum threshold, the VXL-3s will shut down all motor output. The LED on the speed control will slowly blink red, indicating a low-voltage shutdown. The VXL-3s will stay in this mode until a fully charged battery is connected.
- 
 • **Alternating; Blinks Red then Green:** If the motor has no power, the VXL-3s has entered **Over Voltage Protection**. If a battery with too high voltage is used, the VXL-3s will go into a failsafe mode. **Warning:** If input voltage exceeds approximately 20-volts, the ESC may be damaged. Do not exceed 12.6 maximum peak input voltage.
- 
 • **Blinking Green:** The VXL-3s is indicating the transmitter Throttle Trim is incorrectly set. Adjust the Throttle Trim to the middle "0" setting.

GEARING OPTIONS

Battery choice and gearing determine the speed of your model. The following gearing options cover Traxxas Rustler, Bandit and Stampede models. For other applications, refer to the model manufacturer's documentation.

Changing the gearing allows you to fine tune the speed of the model and control the temperatures of the battery pack and motor. Use a lower gear ratio (numerically larger) to reduce current draw and temperatures. Use a higher gear ratio (numerically lower) to increase top speed. When using higher gear ratios, it is important to monitor the temperatures of the battery and motor. If the battery is extremely hot, and/or the motor is too hot to touch, your model is probably over-gearred and drawing too much current. This temperature test assumes that the model is close to factory stock weight and operates freely with no excessive friction, dragging, or binding, and the battery is fully charged and in good condition.

Use the following formula to calculate the overall ratio:

$$\frac{\text{\# Spur Gear Teeth}}{\text{\# Pinion Gear Teeth}} \times 2.72 = \text{Final Gear Ratio}$$

Speed	Bandit	35+mph	45+mph	65+mph	70+mph
	Rustler	35+mph	45+mph	65+mph	70+mph
	Stampede	30+mph	40+mph	60+mph	65+mph
Gearing	Bandit	26-tooth pinion 76-tooth spur	28-tooth pinion 76-tooth spur	33-tooth pinion 76-tooth spur	33-tooth pinion 76-tooth spur
	Rustler	25-tooth pinion 83-tooth spur	28-tooth pinion 83-tooth spur	31-tooth pinion 76-tooth spur	31-tooth pinion 76-tooth spur
	Stampede	19-tooth pinion 86-tooth spur	25-tooth pinion 86-tooth spur	26-tooth pinion 86-tooth spur	30-tooth pinion 83-tooth spur
Battery		6-cell NiMH	7-cell NiMH	3S 20C LiPo	3S 20C LiPo
Nominal Voltage		7.2V	8.4V	11.1V	11.1V
mAh		3000+ mAh	4000+ mAh	4000+ mAh	8000+ mAh
Skill Level		1	2	5	5

All models equipped with Velineon Power System and upgraded drivetrain components.

Gearing Compatibility Chart

The chart below shows recommended gear combination ranges when using a NiMH battery pack to power a Rustler, Bandit, or Stampede equipped with the Velineon System and upgraded drivetrain components. In the red range, use a battery that has a continuous rating of at least 70A.

Spur Gear

	76	83	86	90
12	-	-	19.50	20.40
13	-	-	18.01	18.82
14	-	-	16.70	17.49
15	-	15.04	15.58	16.32
16	-	14.12	14.63	15.31
17	-	13.27	13.76	14.39
18	-	12.54	13.00	13.60
19	-	11.89	12.32	12.89
20	-	11.28	11.69	12.24
21	-	15.60	11.14	11.66
22	9.38	10.25	10.63	11.12
23	8.97	9.82	10.17	10.63

Spur Gear

	76	83	86	90
24	8.62	9.41	9.74	10.20
25	8.27	9.03	9.36	9.79
26	7.94	8.67	9.00	-
27	7.64	8.35	8.67	-
28	7.37	8.05	8.35	-
29	7.12	7.78	8.08	-
30	6.88	7.53	-	-
31	6.66	7.29	-	-
32	6.47	7.04	-	-
33	6.26	-	-	-
34	6.09	-	-	-
35	5.90	-	-	-

Use NiMH batteries with:

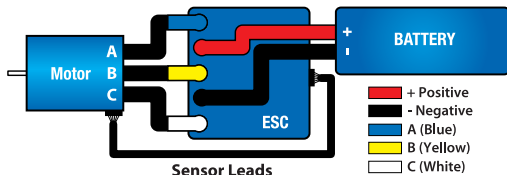
- Bandit, Rustler or Stampede with Velineon System
- Only Bandit and Rustler with Velineon System
- Only Bandit with Velineon System
- Do Not Use NiMH (battery must have a continuous rating of at least 70A. Consult with your hobby dealer or battery manufacturer.)

MOTOR OPTIONS

The VXL-3s electronic speed control is capable of controlling brushed, brushless, and sensed brushless motors. The VXL-3s auto-detects the motor type and has numerous built-in safeguards to prevent damage from miswiring or damaged wiring.

Sensored brushless motors

The VXL-3s is fully compatible with sensed brushless motors. Sensor motors use an additional sensor installed in the motor to communicate rotor position to the speed control. The VXL-3s features a covered auxiliary port that accepts aftermarket motor sensors on the front face of the unit. The VXL-3s has built-in Sensor Motor Backup Protection to prevent damage if the sensor leads or phase leads become disconnected. If a sensor lead becomes damaged or is disconnected, the VXL-3s automatically switches to sensorless brushless operation. The VXL-3s also features Sensor Phase Detection. When a sensed brushless motor is connected, the VXL-3s will check for proper wiring. If the motor phase wiring is incorrect, the VXL-3s will not apply power to the motor until it is wired correctly.



Brushed motors

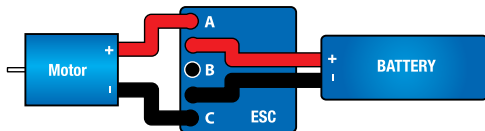
For the ultimate in versatility, the VXL-3s has no motor limit when used with a brushed motor. This allows you to use any readily available 540 or 550 size brushed motors in your VXL-3s equipped vehicle. Always be sure to follow all break in and maintenance instructions set forth by the motor manufacturer. The VXL-3s automatically detects what kind of motor it is connected to so no programming actions are required to use brushed motors. Simply be sure to properly connect the motor to the speed control as shown.

- Motor positive (+) should be connected to phase A (blue).
- Phase B is not used.
- Motor negative (-) should be connected to phase C (white).

If the wiring is reversed, the motor will operate in reverse. If the motor is wired incorrectly (using phases A+B or B+C), the VXL-3s will send short pulses to the motor and turn off the LED indicating a fail safe mode. It will not return to normal operation until wired properly.

Sensorless brushless motors

Sensorless motors are the easiest and most reliable brushless motor type. The VXL-3s is optimized to deliver the smoothest possible sensorless motor performance. The Velineon 3500 is a sensorless brushless motor. The wiring (phase alignment) of the motor determines its direction of rotation. Refer to the wiring diagram on page 15.



TROUBLESHOOTING

This guide describes possible speed control problems, causes, and simple solutions. Check these items before contacting Traxxas.

Steering channel works but the motor will not run:

- The speed control has thermally shut down. Allow the speed control to cool down. Use a milder motor or a smaller pinion gear. Check the drive train for restrictions. Check the motor connections. Check the motor.
- Make sure the speed control is plugged into the throttle channel of the receiver. Check operation of the throttle channel with a servo.
- Bad battery or motor. Check the operation with known good battery and motor.
- VXL-3s: Possible internal damage. Return the VXL-3s to Traxxas for service.

Motor runs backwards:

- Motor wired backwards - Check the wiring and correct.
- Transmitter incorrectly set, see page 20.

Motor runs as soon as the battery is plugged in:

- Internal damage, return VXL-3s to Traxxas for service.

VXL-3s will not go into programming mode:

- Make sure the VXL-3s is plugged into Channel 2 (the throttle channel) on the receiver. If it is plugged into the battery terminal, it will not go into programming mode.
- Be sure the VXL-3s is turned off before trying to program or select a profile.
- Unplug battery, reconnect, and repeat programming instructions.
- Check if transmitter is turned on.

Receiver glitches/throttle stutters during acceleration:

- The receiver or antenna is too close to power wires or the batteries.
- Bad connections - Check the wiring and connectors.

- Motor worn - Replace the motor.
- Excessive current to motor (over-gear motor) - Use a smaller pinion gear.
- Battery voltage low. Recharge and/or verify charged status.
- Disconnected brushless motor lead. Reconnect according to appropriate wiring diagram.

Model runs slowly / slow acceleration:

- Check the motor and battery connectors.
- Check to see if VXL-3s is in Profile #3 (50% throttle)
- Bad battery or motor. Check the operation with known good battery and motor.
- Incorrect transmitter or speed control adjustment. Refer to the "Transmitter Setup" and "VXL-3s Setup Programming" sections.
- VXL-3s is in Thermal Shutdown Protection. Allow to cool and check for proper gearing.
- VXL-3s has entered Low-Voltage Protection.

Steering servo does not work:

- Check the wires, radio system, crystals, battery and motor connectors, and the battery pack.
- Possible internal damage. Test the servo on channel 2 of the receiver or in another model. Return the servo to Traxxas for service.

Model will not go in reverse:

- Make sure the throttle trim is in the correct position (LED on VXL-3s should be lit solid at neutral throttle)
- Check for correct VXL-3s profile (Profile #2 does not have reverse).
- If brushed motor is being used, verify proper connection to VXL-3s. Correct if necessary.



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