

## LI-PO CUT-OFF CIRCUITRY

Your Rooster 12T reversible speed control is Novak's first ESC with built-in Smart-Stop Li-Po Cut-Off Circuitry for safe, worry-free operation when using Lithium Polymer batteries. When the speed control is in Profile 3 or Profile 4, the Smart-Stop Li-Po Cut-Off circuitry is active.

The Smart-Stop Cut-Off circuitry constantly monitors the Li-Po battery's pack voltage. When the pack's voltage begins to get close to the critical safety voltage, the Cut-Off circuitry will start interrupting, or 'blipping' the throttle output. This 'blipping' acts as an early warning to you that the battery voltage is getting low, and that the throttle output to the motor will soon be completely shut off.

When the battery pack's critical safety voltage is finally reached, the Smart-Stop Cut-Off circuitry will completely shut down the throttle output signal to the motor to keep the battery voltage from dropping further (*Red & Green LEDs will alternately flash--you will still have steering control*). **Re-charge battery pack after Smart-Stop circuitry shuts off throttle.**

After a short resting period, the battery's voltage will rise back above the critical safety voltage, and the ESC will operate normally again for a short period of time. **This is not good for the battery pack, as reaching the critical safety voltage too many times can also cause damage to the cells. DO NOT CONTINUE TO RUN VEHICLE AFTER THE SMART-STOP HAS SHUT DOWN THE THROTTLE OUTPUT FOR THE FIRST TIME.**

If Profile 3 or Profile 4 is used with Ni-Cd or Ni-MH type batteries, the cut-off circuitry will shut off the speed control's throttle output very early into the battery pack's runtime, due to the different characteristics of these batteries—Change ESC's Throttle Profile to Profile 1 or Profile 2 for use with these batteries.

## AUXILIARY FAN CONNECTION

The Rooster 12T reversible speed control also features a set of power output pins for running auxiliary cooling fans. This allows you to add cooling fans to either the motor, the speed control, or both, and the best part is that they will automatically switch off when you turn off the speed control's power switch.

These pins output 6.0 volts DC (the same as the BEC), so you will get maximum output from your cooling fans.



The Rooster's pin-out label located on the front lower section of the ESC's case (*under the pins, push button, & LEDs*) shows the location and the polarity of the fan power output pins. They are the 2 pins on the front edge of the circuit board—Positive (+) is on the left, and Negative (-) is on the right. **The set of 3 pins behind them are for the user-replaceable input signal harness, and the polarity of those is the same--Positive in the middle, Negative on the right, and the extra pin on the left is signal.**

The Novak 30x30x6mm clear cooling fan that comes on the GTB speed control (*Novak kit #5648*) not only fits the size of the Rooster's heat sink perfectly, it also comes with the connector already on it for directly plugging in. Fans that do not have the proper connector on them, will need a connector (*one end of an old receiver input harness would work well*), or will need to be soldered to the pins--**Take extra care if attempting to solder to the fan power output pins--Do not overheat the pins or the circuit board, and do not allow any solder or wire strands to cause a short circuit with other pins or the heat sink.**

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Monday-Friday: 8:00am-5:00pm (PST)

## TROUBLE-SHOOTING GUIDE

### Steering Channel Works But Motor Will Not Run

- **Red LED flashing:** Speed control has thermally shut down—Allow ESC to cool down—Use milder motor or smaller pinion gear—Check for adequate cooling to ESC's heat sink.
- **Red & Green LEDs alternately flashing:** Smart-Stop Li-Po circuitry has shut off throttle output—Use a charged Li-Po battery. Using Ni-Cd or Ni-MH batteries with ESC in Profile 3 or 4—change battery type or ESC Profile.
- Check motor connections. Check motor and brushes.
- Make sure ESC is plugged into the throttle channel of receiver. Check wiring color sequence of receiver signal harness (Refer to Step 1).
- Possible receiver damage—Check operation with a different receiver.
- Possible internal damage—Refer to Service Procedures.

### Receiver Glitches/Throttle Stutters During Acceleration

- Receiver or antenna too close to ESC, power wires, battery, or motor.
- Bad connections—Check wiring, connectors, & sensor harness.
- Motor capacitors broken or missing—Refer to Step 3.
- Excessive current to motor—Use a milder motor or a smaller pinion gear.
- External Power Capacitor damaged/not installed—Replace Capacitor.

### Motor and Steering Servo Do Not Work

- Check wires, receiver signal harness wiring & color sequence, radio system, crystals, battery/motor connectors, & battery pack.
- Possible receiver damage—Check operation with a different receiver.
- Possible internal damage—Refer to Service Procedures.

### Speed Control Runs Excessively Hot

- Gear ratio too low—Increase gear ratio.

### Model Runs Slowly/Slow Acceleration

- Gear ratio too high—Reduce gear ratio.
- Check battery connectors—Replace if needed.
- Incorrect ESC/transmitter adjustment—Refer to Step 4 & Transmitter Adjustments sections.
- External Power Capacitor damaged/not installed—Replace Power Capacitor.

### Motor Runs Backwards

- Motor wired backwards—Check wiring and reverse.
- Backwards motor timing—Reverse motor end bell.

### ESC Is Melted Or Burnt/ESC Runs With Switch Off

- Internal damage—Refer to Service Procedures.

*\*For more assistance call our Customer Service Department or check our website.*

## SERVICE PROCEDURES

Before sending your speed control in for service, please review the Trouble-Shooting guide and instructions. Speed control may appear to have failed when other problems exist.

After reviewing instructions, if you feel that your ESC requires service, please obtain the most current product service options and pricing by the following ways:

**WEBSITE:** Print a copy of the **PRODUCT SERVICE FORM** from the CUSTOMER SERVICE section of the Novak website. Fill out the needed information on this form and return it with the Novak product that requires servicing.

**PHONE/FAX:** If you do not have access to the internet, please contact our customer service department by phone or fax as listed below.

**WARRANTY SERVICE:** For warranty service, you **MUST CLAIM WARRANTY** on the **PRODUCT SERVICE FORM** and include a valid cash register receipt with purchase date and dealer name & phone# on it, or an invoice from previous service. If warranty provisions have been voided, there will be service charges.

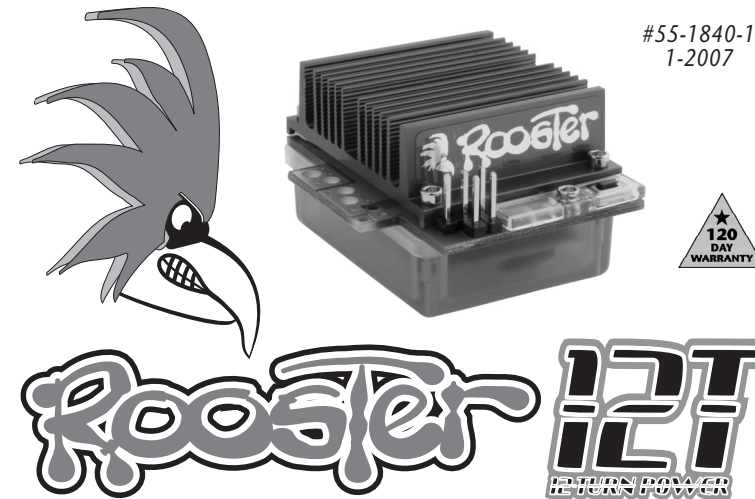
- **ESCs returned without a serial number will not be serviced under warranty.**

### ADDITIONAL NOTES:

- Dealers/distributors are not authorized to replace Novak products thought to be defective.
- If a hobby dealer returns your product for service, submit a completed **PRODUCT SERVICE FORM** to the dealer and make sure it is included with the product.
- Novak Electronics, Inc. does not make any internal electronic components (*transistors, resistors, etc.*) available for sale.

[www.teammovak.com](http://www.teammovak.com)

# ROOSTER 12T--INSTRUCTIONS



## SPECIFICATIONS

Input Voltage.....	4-7 cells (@1.2 volts DC/cell) / 2 Li-Po cells
Li-Po Cut-Off Voltage.....	6.25 volts DC
ESC Footprint.....	1.18" x 1.54" [30x39mm]
ESC Weight (w/o wires).....	1.57 ounce [44.5 grams]
B.E.C. Rating.....	6.0 volts DC / 1.5 amps
Power Wire (Battery/Motor).....	14G Super-Flex Silicone
Rated Current.....	400A Fwd / 200A Rev @25°C trans.temp.
On-Resistance.....	0.0014Ω Fwd / 0.0028Ω Rev @25°C trans.temp.
Motor Limit.....	12-turn [brush-type motor @ 6 cells (1.2VDC/cell)]
Throttle Profiles.....	4 [2 fwd/brk/rev & 2 w/rev.lock out]
Switched Fan Output.....	6.0 volts DC

### The Rooster Reversible is back, and is better than ever!

*The Rooster 12T reversible electronic speed control brings you rugged 12-turn motor handling, built-in Smart-Stop Li-Po Cut-Off circuitry, and all the performance you've come to expect from Novak.*

The ESC also features *Thermal Overload Protection*, *high-power B.E.C.* for strong/fast servo response, *Polar Drive & Digital Anti-Glitch circuitries* for cool & smooth operation, and *Radio Priority circuitry* for the ultimate in control, right down to the end of the charge. Add to this the user-replaceable power wires, power capacitor, & input harness, along with power output for auxiliary cooling fans that turn on & off with the ESC's power switch, and the new Rooster 12T has it all!

**To benefit from all of the technical features of the Rooster 12T, PLEASE READ ALL INSTRUCTIONS**

## PRECAUTIONS

### WATER & ELECTRONICS DON'T MIX!

Never allow water, moisture, or other foreign materials to get inside ESC, motor, or on the PC Boards. **Water damage will void the warranty!**

### NO SCHOTTKY DIODE!

Schottky diodes must NOT be used with the Rooster ESC. (*Schottky diodes are never used with reversible ESCs, including brushless*) **Schottky diode usage will damage ESC & void warranty!**

### DISCONNECT BATTERIES WHEN NOT IN USE

Always disconnect the battery pack from the speed control when not in use to avoid short circuits and possible fire hazard.

### 4 TO 7 CELLS OR 2-CELL LI-PO ONLY

If using Ni-Cd or Ni-MH batteries, **NEVER** use fewer than 4 or more than 7 cells (4.8-8.4VDC, 1.2VDC/cell) in the vehicle's main battery pack.

If using Li-Po batteries, **ONLY** use a 2-cell pack for the vehicle's main battery & be sure to use Profile 3 or 4 with the built-in Li-Po cut-off.

### NO REVERSE VOLTAGE!

Reverse battery polarity can damage ESC & void warranty. Disconnect battery immediately if a reverse connection occurs.

### POWER CAPACITOR REQUIRED

An external power capacitor is installed and **MUST** be used with your ESC. **Failure to use Power Capacitor will result in higher ESC operating temperatures & possible thermal shut-down.**

### TRANSMITTER ON FIRST

Always turn on the power of the transmitter first so that you will have control of the vehicle when you turn it on.

### INSULATE WIRES

Always insulate exposed wiring with heat shrink tubing or electrical tape to prevent short circuits, which can damage ESC.

### NO SOLVENTS

Exposing the speed control's case to any type of solvents will damage the plastic.

### NO CA GLUE

Exposure to CA glue or its fumes can cause damage to internal components of the speed control and result in premature failure.

## OPTIONAL ACCESSORIES

### REPLACEMENT POWER CAPACITOR [Novak kit #5677]

The Rooster 12T ESC comes with a factory-installed Power Capacitor, and it **MUST BE USED** to maintain cool and smooth operation. A direct replacement Power Capacitor is available in Novak kit #5677.

*Note: We highly recommend using Novak Power Capacitors, as we have done extensive testing & research to find Power Capacitors with the very best quality factors--other capacitors with similar ratings will not provide equal protection.*

### SUPER-FLEX SILICONE 14G WIRE [Novak kits #5500 & 5505]

Novak Super-Flex wire for power wiring. 14 gauge silicone wire in kit #5500 (36"red & 36"black) and kit #5505 (36"red & 36"blue).

### INPUT SIGNAL HARNESS [Novak kits #5315 & 5320]

User-replaceable input signal harness is available in both short and long lengths. 4.5" harness in Novak kit#5315, and 9.0" harness in Novak kit #5320.

### MOTOR CAPACITORS [Novak kit #5620]

Additional motor capacitors are available in Novak kit #5620.

### AUXILIARY COOLING FANS [Novak kits #5647 & #5648]

The Rooster 12T comes with power output pins ready to add a cooling fan that will switch on & off with the ESC's power switch. **Novak 25x25x10mm fan with long leads for cooling motor is available in Novak kit #5647. Novak 30x30x6mm clear fan that fits perfect over the ESC's heat sink and has a connector already on its leads is available in Novak kit #5648.**

## PRODUCT WARRANTY

The Rooster 12T ESC is guaranteed to be free from defects in materials or workmanship for a period of 120 days from the original date of purchase (*verified by dated, itemized sales receipt*). Warranty does not cover incorrect installation, components worn by use, damage to case or exposed circuit boards, damage from using fewer than 4 or more than 7 Ni-Cd or Ni-MH cells (1.2 volts DC/cell) or fewer or more than 2 Li-Po cells input voltage, cross-connection of battery/motor power wires, overheating solder tabs, reverse voltage application, damage resulting from thermal overload, damage from incorrect installation of FET servo or receiver battery pack, not using or incorrect installation of a Power Capacitor on ESC or from using a damaged Power Capacitor, using a Schottky diode, using non-Novak Power Capacitor, splices to input or ON/OFF switch harnesses, damage from excessive force when using the One-Touch/SET button or from disassembling case, tampering with internal electronics, allowing water, moisture, or any other foreign material to enter ESC or get onto the PC board, incorrect installation/wiring of motor/battery connectors, input plug plastic, or auxiliary cooling fan, allowing exposed wiring, pins, or solder tabs to short-circuit, or any damage caused by a crash, flooding, or act of God.

Because Novak Electronics, Inc. has no control over the connection & use of the speed control or other related electronics, no liability may be assumed nor will be accepted for any damage resulting from the use of this product, including battery packs. Every Novak speed control & motor is thoroughly tested & cycled before leaving our facility and is, therefore, considered operational. *By the act of connecting/operating speed control, user accepts all resulting liability.* In no case shall our liability exceed the product's original cost. We reserve the right to modify warranty provisions without notice.

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## STEP 1—CONNECT INPUT HARNESS

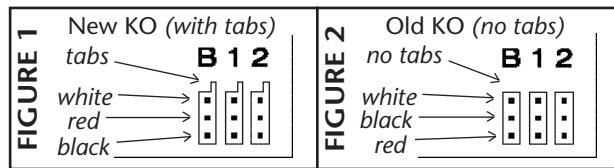
The Rooster 12T has the industry-standard receiver input connector on a user-replaceable input harness & **works with all major radio brand's new receivers**. However, some very old receivers must have the wiring sequence in the plastic 3-pin connector housing changed. **This is important, because receiver & servo electronics may be damaged if the sequence is incorrect.**

### CHANGING WIRING SEQUENCE @ RECEIVER END

#### JR • Hitec • Futaba • New KO • Airtronics Z

JR, Hitec, Futaba, new KO, & Airtronics Z receivers do not need input harness re-wiring. Airtronics Z receivers have blue plastic cases & new KO cases have tabs on the input harness openings as in Figure 1.

- Plug one end of the input signal harness into the THROTTLE CHANNEL (#2) of receiver with the **BLACK wire toward the outside edge** of receiver case.
- Plug the other end of the input harness into 3-pin header on the front edge of the ESC's circuit board with the **WHITE wire toward the left side** of the ESC (refer to pin-out label on case).

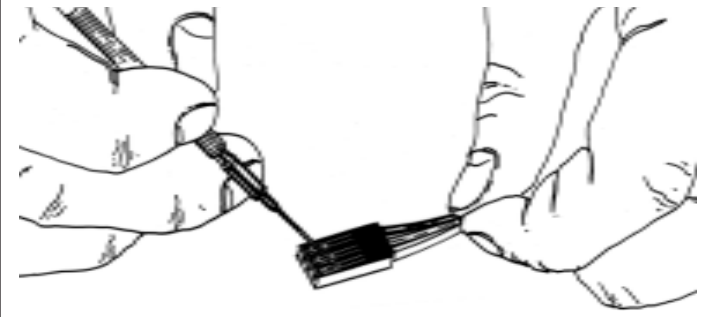


#### Old-style KO • Old-style Sanwa/Airtronics

If you have an older KO or Sanwa/Airtronics, you must change the sequence of the ESC's input harness wires--Old Sanwa/Airtronics cases are black color & Old KO cases do not have tab openings, as in Figure 2 above.

- Using a small flat blade screwdriver, **remove the red & black wires** from the plastic housing at the receiver end of the input harness as in Figure 3 below.
- **Interchange the red and black wires** in the plastic 3-pin connector housing at the receiver end of the input harness.
- Insert modified end of the harness into the THROTTLE CHANNEL (#2) of receiver with the **RED wire toward the outside edge** of receiver case.
- Plug the other end of the input harness into the ESC with the **WHITE wire toward the 'S' (signal) marking** on the ESC's case.

**FIGURE 3** With a small standard screwdriver, gently lift plastic prong until wire and metal socket easily slide out of plastic housing.



## STEP 2—MOUNTING ESC

Be sure to position the ESC with the power wires away from other electronics & moving parts in the vehicle. Select a location that allows airflow through heat sinks--**If the ESC gets good air flow, it will run cooler; and that means it will be more efficient!**

- 1. MOUNT ESC IN THE VEHICLE** using the included double-sided tape. Be sure receiver & antenna are mounted as far from ESC, power wires, battery, & servo as possible--these components all emit RF noise when throttle is applied. On graphite or aluminum chassis vehicles, it may help to place receiver on edge with crystal & antenna as far above chassis as possible. Note: Mount antenna as close to receiver as possible--trail any excess wire off top of antenna mast (cutting or coiling excess antenna wire will reduce radio range).
- 2. MOUNT POWER CAPACITOR IN THE VEHICLE** using the included double-sided tape, or secure it to part of the vehicle with a tie-wrap. The Power Capacitor can also be tie-wrapped along the battery power wires. If the Power Capacitor becomes dented or damaged, ESC failure can occur--replace damaged Power Capacitors immediately.
- 3. INSTALL ON/OFF SWITCH** using a screw or the included double-sided tape. Position in the vehicle where it will be easy to access.

## STEP 3—MOTOR & BATTERY CONNECTION

### 1. MOTOR CAPACITORS

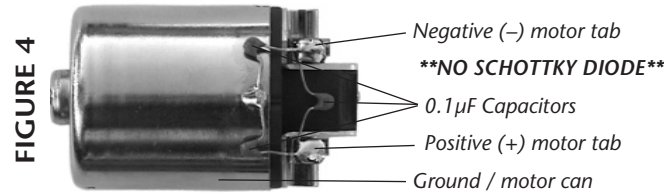
Electric motors generate RF noise that causes interference. The included 0.1µF (50V) non-polarized, ceramic capacitors must be used on all motors to reduce motor noise & prevent ESC damage.

*Note: Some motors come with capacitors built-in. If your motor only has two capacitors, you need to install a capacitor between the positive & negative motor tabs--If you experience radio interference when using only built-in capacitors, install external ones.*

Solder 0.1µF (50V) capacitors between:

- POSITIVE (+) motor tab & NEGATIVE (-) motor tab.
- POSITIVE (+) motor tab & GROUND tab\*.
- NEGATIVE (-) motor tab & GROUND tab\*.

\*If motor has no ground tab (below), solder the capacitors to motor can.



Extra 0.1µF capacitors are available in Novak kit #5620.

### 2. DO NOT USE SCHOTTKY DIODES

Schottky diodes must NOT be used with reversible ESCs (including brushless). Schottky diode usage will damage the ESC & void warranty.

### 3. FACTORY-INSTALLED POWER CAPACITOR REQUIRED

The ESC comes with a factory-installed Power Capacitor, and it MUST be used for proper operation and protection. If Power Cap. becomes dented or damaged, ESC failure can occur--replace immediately. Longer Power Capacitor wires will decrease performance.

### 4. SOLDER MOTOR POWER WIRES TO MOTOR

- Cut the ESC's **BLUE & YELLOW** silicone motor power wires to the desired length, and strip 1/8-1/4" of insulation from the end of each wire. Tightly twist the exposed strands of wire.
- Solder the ESC's **BLUE** motor wire to the **motor's negative (-) tab**.
- Solder the ESC's **YELLOW** motor wire to the **motor's positive (+) tab**.

### 6. CONNECT SPEED CONTROL TO BATTERY PACK

Connect the ESC's Tamiya-style JST battery connector to a charged 4 to 7 cell (1.2VDC/cell) battery pack (or 2-cell Li-Po pack). Connector can also be changed to a different type, or ESC can be hard-soldered directly to battery pack.

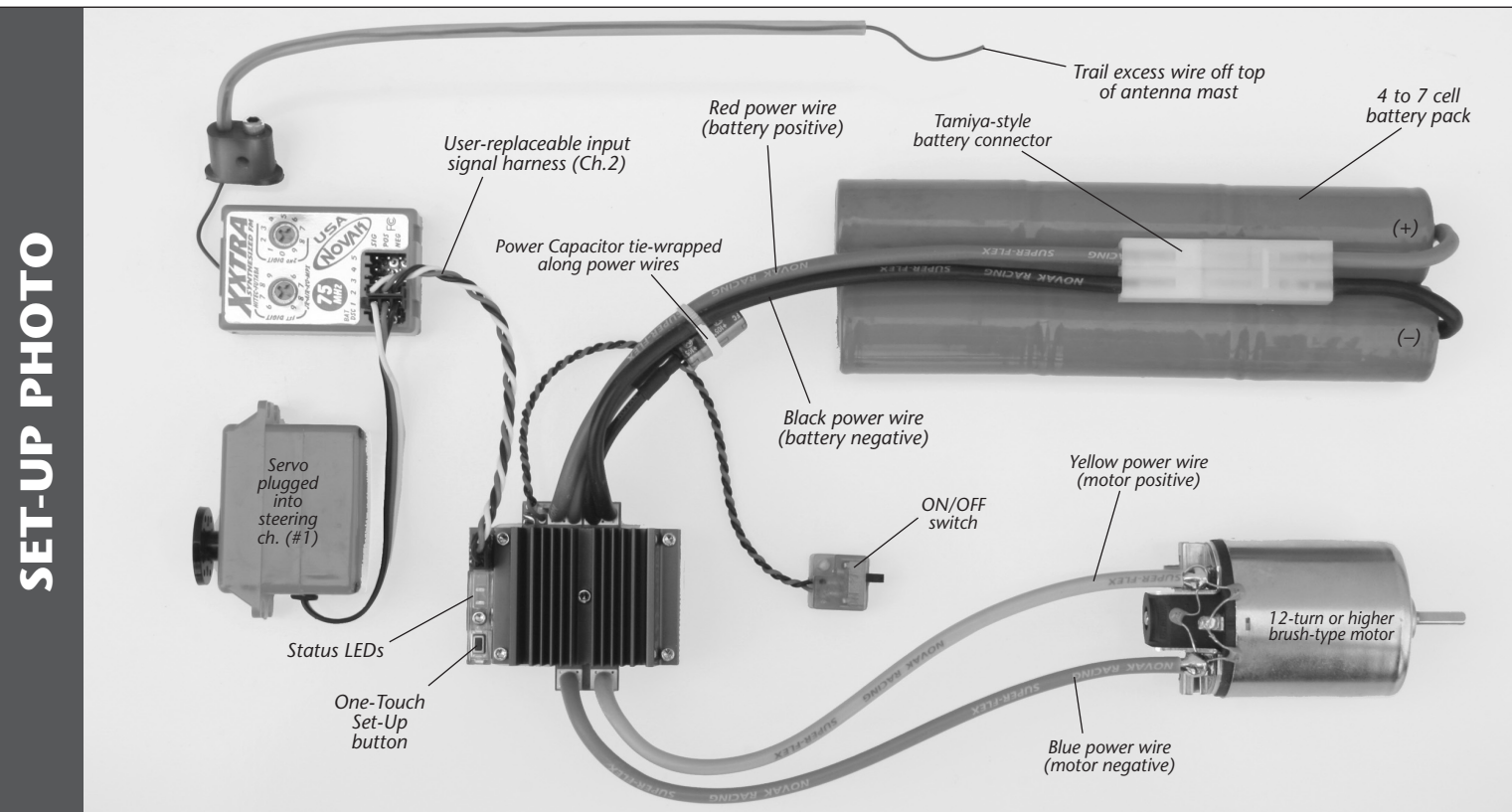
### CONNECTOR USAGE

If you are going to use connectors on the ESC's motor wires, we highly suggest Dean's Ultra plugs or other low-loss connectors--do not use crimp type connectors. Note: If you plan to change the battery connector, be aware that this can void the warranty if not done properly.

To prevent possible cross-connection of motor and battery wires:

- Use connectors that cannot be plugged in backwards. Reverse voltage will damage the ESC and void warranty.
- Use a female connector on battery packs to avoid shorting.

For additional information on connector usage, visit our website.



### USING A RECEIVER BATTERY PACK

Your new speed control has a built-in BEC (battery eliminator circuit), and you do not need to use a separate receiver battery pack, however if you are planning to use one to power the electronics you need to do the following:

1. Plug the external 5 cell (1.2VDC/cell) receiver battery pack into the battery slot of the receiver.
2. Leave the ESC's ON/OFF switch in the OFF position, and use receiver battery pack's ON/OFF switch to turn the system power on and off--Do not use the ESC's switch.

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## STEP 4—ONE-TOUCH PROGRAMMING

With ESC connected to (at least) a receiver & a charged battery pack:

- 1. TURN ON THE TRANSMITTER'S POWER**
- 2. PRESS & HOLD ESC'S ONE-TOUCH/SET BUTTON**
- 3. TURN ON THE SPEED CONTROL'S POWER**  
With transmitter throttle at neutral, and still pressing the SET button, slide the ESC's ON/OFF switch to ON position.
- 4. CONTINUE HOLDING SET BUTTON UNTIL RED LED COMES ON**
- 5. RELEASE SET BUTTON AS SOON AS LED TURNS RED**
- 6. PULL TRANSMITTER THROTTLE TO FULL-ON POSITION**  
Hold it there until the green status LED turns solid green. Note: Motor will not run during programming even if connected.
- 7. PUSH TRANSMITTER THROTTLE TO FULL-BRAKES**  
Hold it there until the green status LED blinks green.
- 8. RETURN TRANSMITTER THROTTLE TO NEUTRAL**  
Red status LED will turn solid red, indicating that speed control is at neutral and that proper programming has been completed. NOTE: If transmitter settings are changed, One-Touch Programming must be repeated. If you experience any problems, turn off ESC & repeat One-Touch.

**REMEMBER:** Whenever One-Touch set-up is performed, ESC automatically reverts to Throttle Profile #1.

## TRANSMITTER ADJUSTMENTS

If you have any problems with Step 4, adjust transmitter as follows and then repeat One-Touch programming in Step 4:

- Set **HIGH ATV** or **EPA** to **maximum** setting. [amount of throw at full throttle]
- Set **LOW ATV**, **EPA**, or **ATL** to **maximum** setting. [amount of throw at full brakes]
- Set **EXPONENTIAL** to **zero** setting. [throttle channel linearity]
- Set **THROTTLE CHANNEL REV. SWITCH** to **opposite** position.
- Set **THROTTLE CHANNEL TRIM** to **middle** setting. [adjusts neutral position/increases or decreases coast brakes]
- Set **ELECTRONIC TRIGGER THROW ADJUSTMENT** to **50% throttle** and **50% brake** throw--best for reversible ESCs. [adjusts trigger throw electronic/digital pistol-grip transmitters]
- Set **MECHANICAL TRIGGER THROW ADJUSTMENT** to position with **1/2 throttle** and **1/2 brake** throw.

## THROTTLE PROFILE SELECTION

The ESC is equipped with 4 user-selectable Throttle Profiles to choose from:

PROFILE #1: Forward, brakes, & reverse.	<b>Ni-Cd &amp; Ni-MH cells ONLY</b>
PROFILE #2: Forward & brakes only.	
PROFILE #3: Forward, brakes, & reverse.	<b>Li-Po Cut-Off Circuitry Active</b>
PROFILE #4: Forward & brakes only.	

**NOTE:** ESC is factory set to Throttle Profile #1.

### SELECTING THROTTLE PROFILE:

With ESC on & connected to a charged battery (transmitter ON or OFF):

- 1. IF TRANSMITTER IS OFF, DISCONNECT ESC FROM RECEIVER**  
To avoid possible radio interference from other transmitters, remove the ESC's input signal harness from the receiver.
- 2. PRESS & HOLD THE ESC'S ONE-TOUCH SET BUTTON**  
Continue to hold SET button on ESC until both LEDs turn on.
- 3. RELEASE SET BUTTON AS SOON AS BOTH LEDs COME ON**  
Once released, the 4 status LEDs will flash to indicate what Throttle Profile is currently selected. The number of times the LEDs flash indicates the Throttle Profile selection (1 of 4).
- 4. QUICK PRESS (& release) SET BUTTON TO CHANGE SELECTION**  
Each press will change to the next consecutive Throttle Profile. \*\*\* Note: there is a time constraint during this selection process. \*\*\*
- 5. ESC STORES SELECTION & EXITS TO NEUTRAL**  
If SET button is not pressed for 3 seconds, ESC stores selected Profile into memory & the red LED will come on solid. The speed control is at neutral & is ready to go.

**NOTE:** Whenever One-Touch set-up is performed, ESC reverts to Throttle Profile #1.