

## 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 factory default settings & the Throttle Profile reverts to #1 when in Brushless-Mode.**

## TRANSMITTER ADJUSTMENTS

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

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

\*NOT ALL TRANSMITTERS HAVE THESE ADJUSTMENTS\*

## USING A RECEIVER BATTERY PACK

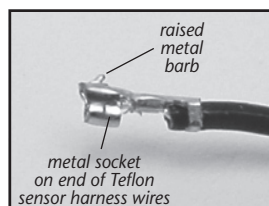
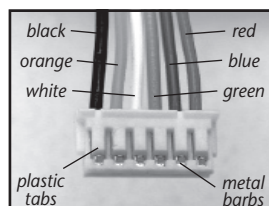
If you are planning to use an external receiver battery pack to power the electronics you need to do the following:

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.

## SENSOR HARNESS WIRING

Should any of the 26G Teflon wires pull out of the connector on the end of the motor's sensor harness, re-insert them in the appropriate slot in the connector as shown below. There is a small plastic tab that grabs a small raised barb on the back of the metal socket crimped onto the Teflon wire's end. The plastic tab should be checked to make sure it has not deformed excessively before inserting the metal socket into the plastic connector housing with the barb toward to plastic tabs.

If the motor's sensor harness gets damaged, please contact our Customer Service Dept.



## TROUBLE-SHOOTING GUIDE

### Steering Channel Works But Motor Will Not Run

- **Red & Green status LEDs on solid**—Check input signal harness connections at ESC and receiver. Check input signal harness wiring sequence—Refer to Step 1.
- **Red status LED on solid & Green LED blinking**—Check motor sensor harness connection. Possible internal motor damage.
- **Blue & Green status LEDs both blinking**. Possible ESC shut-down due to locked rotor detection—return throttle to neutral position to regain motor control—check vehicle's drive train for free operation.
- **Blue & Red status LEDs blinking**. Possible ESC thermal shut-down—Check gear ratio & free operation of drive train for possible overloading/ESC is being severely overloaded—allow system to cool & return throttle to neutral position to regain motor control. *LEDs will continue to blink until system is cooled down.*
- **Blue & Amber status LEDs blinking**. Possible motor thermal shut-down—Check gear ratio & free operation of drive train for possible overloading/motor is being overloaded—allow system to cool & return throttle to neutral position to regain motor control. *LEDs will continue to blink until system is cooled down.*
- **Blue & Green (Locked Rotor Detection), Blue & Red (ESC Thermal Shut-Down), or Blue & Amber (Motor Thermal Shut-Down) status LEDs blinking**. ESC may have shut-down & ESC's neutral point is too far off to sense that transmitter throttle has been returned to neutral—Refer to Step 4.
- 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.
- Low voltage to receiver—Try Glitch Buster capacitor on receiver (Novak part#5626).
- External Power Capacitor damaged/not installed—Replace Power Capacitor.
- Battery pack damaged or weak—Try a different battery pack.
- Motor's magnet has weakened or overheated—Replace rotor.

### Motor and Steering Servo Do Not Work

- Check wires, receiver signal harness wiring & color sequence, radio system, crystals, battery/motor connectors, & battery pack.
- Power wires too close to signal wires—Do not bundle power & signal wires together.
- Possible receiver damage—Check operation with a different receiver.
- Possible internal damage—Refer to Service Procedures.

### Brushless Motor Runs Backwards

- Reverse motor rotation direction—Refer to 'Programming/Gearing' sheet.

### Speed Control Runs Excessively Hot

- Gear ratio too low—Increase gear ratio (see 'GEAR SELECTION').

### Model Runs Slowly/Slow Acceleration

- Gear ratio too high—Reduce gear ratio (see 'GEAR SELECTION').
- Check battery & connectors—Try another battery; replace connectors/battery if needed.
- Incorrect transmitter/ESC adjustment—Refer to Step 4.
- External Power Capacitor damaged/not installed—Replace Power Capacitor.

### 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 or brushless motor system in for service, review Trouble-Shooting guide and instructions. System may appear to have failed when other problems exist.

After reviewing instructions, if you feel that your ESC/system 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 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 work, you **MUST CLAIM WARRANTY** on **PRODUCT SERVICE FORM** & 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 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 product.
- Novak Electronics, Inc. does not make any internal electronic components (transistors, resistors, etc.) available for sale.

## Novak Electronics, Inc.

(949) 833-8873 • FAX (949) 833-1631

Customer Service e-mail: [cs@teammovak.com](mailto:cs@teammovak.com)

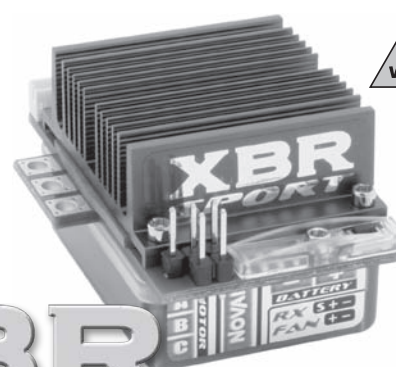
Monday-Friday: 8:00am-5:00pm (PST)

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

## BASIC SET-UP GUIDE -- XBR

• See 'Programming/Gearing' sheet for Proper Gearing, Profile Selection, Custom Programming, & Li-Po Cut-Off •

BRUSHLESS  
NOVAK  
USA



**XBR  
SPORT**

#55-1720-1  
S-2007

### Brushless & Brush Motor Control and Full Programmability!

The XBR Sport programmable electronic speed control gives you the best of everything--Sensor-based brushless motor control, world class brush motor performance with Auto-Detect Brush-Mode, & complete on-board programming of Minimum Drive, Minimum Brake, Drag Brake, Dead Band, LiPo Cut-Off, Motor Rotation, & Drive Frequency (in Brush Mode)....Now that's Extreme Sport Versatility!

The XBR Sport is factory-loaded with 4 throttle programs to choose from (including a limited reverse Marine Mode), Novak's Smart Braking II (you don't go into reverse until you shift into reverse by returning the trigger to neutral and then back to reverse), Thermal Overload Protection, high-power B.E.C. for strong/fast servo response, Polar Drive & Digital Anti-Glitch circuitries for cool & smooth operation, auxiliary fan power output, and Radio Priority circuitry for the ultimate in control, right down to the end of the charge. Add to this the user-replaceable battery wires, power capacitor, & input harness, and the XBR Sport has it all!

To benefit from all of the technical features of the XBR Sport, PLEASE READ ALL INSTRUCTIONS BEFORE OPERATION

## 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 IN BRUSHLESS-MODE!

Schottky diodes must NOT be used when using ESC in Brushless-Mode (Schottky diodes are never used with reversible ESCs, including brushless).

Schottky diode usage in Brushless-Mode 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 (1.2VDC/cell) in the vehicle's main battery pack.

If using Li-Po batteries, ONLY use a 2-cell (2S) pack for the vehicle's main battery & be sure the Li-Po Cut-Off programming option is turned ON.

### NOVAK BRUSHLESS MOTORS ONLY

The XBR Sport is designed for use with sensor-based Novak Brushless Motors. You may replace with Novak sensored motors down to 8.5 turns.

### 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 on ESC & MUST be used. Failure to use Capacitor will result in higher temperatures & possible thermal shut-down or damage.

### 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.

### GOOD QUALITY TRANSMITTER SUGGESTED

With the higher performance of brushless systems, undesirable radio system noise may occur when used with lower quality transmitters (like some RTR radios).

### DO NOT BUNDLE POWER & SIGNAL WIRES TOGETHER

RF noise in the power wires can adversely effect radio system performance.

### INSULATE WIRES

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

### 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.

## SPECIFICATIONS

Input Voltage.....	4-7 cells (1.2 VDC/cell), 2 Li-Po cells
ESC Footprint.....	1.18" x 1.54" [30x39mm]
ESC Weight (w/o wires).....	1.49 ounce [42 grams]
B.E.C. Voltage/Current.....	6.0 volts DC/1.5 amps
Power Wire (Battery/Motor).....	14G Super-Flex Silicone
On-Resistance (Brushless).....	0.0012Ω @25°C trans.temp.
On-Resistance (Brush-Mode).....	0.00027Ω @25°C trans.temp.
Rated Current (Brushless).....	120A [per phase] @25°C trans.temp.
Rated Current (Brush-Mode).....	480A [Fwd & Brakes] @25°C trans.temp.
Motor Limit (Brushless).....	Down to 8.5-turn Novak (@6 cell)
Motor Limit (Brush-Mode).....	None
Throttle Programs (Brushless).....	3 [2 w/Rev. & 1 Fwd/Brake]
Throttle Program (Brush-Mode).....	1 [Fwd/Brake]

## OPTIONAL ACCESSORIES

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

The XBR Sport comes with a factory-installed Power Capacitor, and one **MUST BE USED** to maintain cool & smooth operation. Upgrade Power Capacitor available in Novak kit #5675---Novak has done extensive testing & research to find Power Capacitors with the best quality factors---other similar rated capacitors will not provide equal protection.

### SUPER-FLEX SILICONE 14G WIRE [Novak kits #5500 & 5508]

Novak Super-Flex wire for power wiring. 14 gauge silicone wire in kit #5500 (36"red & 36"black) or kit #5508 (2 each of 9"red/black/blue/yellow/orange).

### 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.

### EX & SS5800/SS4300 MOTOR END BELL & BEARING SET

Front end bell with bearing factory-installed & rear bearing available in Novak kit #5905.

### 30x30x6mm COOLING FANS [Novak kits #5648 & 5651]

Clear cooling fans fit XBR's heat sink perfectly & have correct power plug for easy connection. Single fan in Novak kit#5648, and 2-pack of fans in Novak kit #5651.

### LEAD-FREE 3% SILVER RACING SOLDER [Novak kit #5830]

High silver content for making ultra low-resistance solder joints for high efficiency and better performance. Tube with 10 feet of solder in Novak kit #5830.

## PRODUCT WARRANTY

The XBR Sport Brushless 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 cells (1.2 volts DC/cell) or more than 2 LiPo cells input voltage, cross-connection of battery/motor power wires, overheating solder tabs, reverse voltage application, damage resulting from thermal overload or short-circuiting motor (or connecting a brushless motor sensor harness while operating in Brush-Mode), damage from incorrect installation of FET servo or receiver battery pack, not using or incorrect installation of a Power Capacitor on the ESC or from using a damaged Power Capacitor, using a Schottky diode in Brushless-Mode, using non-Novak Power Capacitor or motor, splices to input, ON/OFF switch, or sensor 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 input plug plastic, allowing exposed wiring or solder tabs to short-circuit, or any damage caused by a crash, flooding, or act of God.

Because Novak 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. 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. Designed by Novak Electronics, Inc. in Irvine, CA and assembled with globally sourced components.

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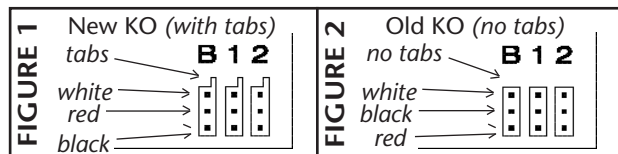
## STEP 1-CONNECT INPUT HARNESS

The XBR Sport 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.

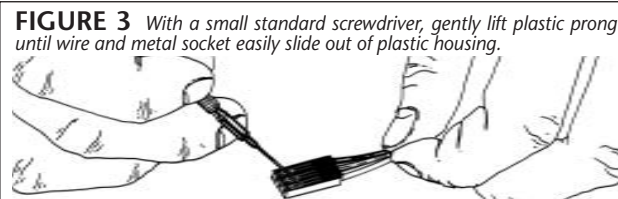
- Plug one end of the input signal harness into the THROTTLE CHANNEL (#2) of receiver with the **BLACK wire toward the outside edge** of receiver case.
- Plug the other end of the input harness into 3-pin header inside the ESC's case with the **WHITE wire toward the 'S' (signal) marking** on the ESC's case above the rectangular signal harness opening.



### 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.



## STEP 2-WIRING SPEED CONTROL, MOTOR, & BATTERY

### NOVAK BRUSHLESS MOTORS (Fig.4)

Amber LED flashes 4 times at start-up when transmitter signal is present

- MOTOR CAPACITORS NOT NEEDED**  
Novak brushless motors do not require external motor capacitors.
- DO NOT USE SCHOTTKY DIODES IN BRUSHLESS-MODE**  
Schottky diodes must NOT be used with reversible ESCs (including brushless). Schottky diode usage will damage the ESC & void warranty.
- FACTORY-INSTALLED POWER CAPACITOR REQUIRED**  
The factory-installed Power Capacitor MUST be used with brushless & brush-type motors. If Power Capacitor becomes dented or damaged, ESC failure can occur--replace immediately. Longer Power Capacitor wires will decrease performance.
- CHECK FOR PROPER GEARING**  
Refer to the 'PROPER GEAR SELECTION' portion of the PROGRAMMING/GEARING Sheet (Pg.5) to determine proper gearing & avoid overheating.

### 5. SOLDER MOTOR POWER WIRES TO MOTOR

- \*Skip this step if installing complete system with ESC factory-wired to motor.
- A. Cut the **BLUE, YELLOW, & ORANGE** silicone motor power wires of the desired length, and strip 1/8-3/16" of insulation from the end of each wire. Tightly twist the exposed strands of wire, and tin the exposed end section of each wire with solder with a good, high heat iron.

- B. Solder the ESC's **BLUE Phase 'A'** motor wire to the motor's phase 'A' solder tab. Apply heat to exposed wire with soldering iron, and add solder to the tip of the iron & the wire--Add just enough solder to form a clean & continuous joint from the solder tab up onto the wire.

#### IMPORTANT NOTE: DO NOT OVERHEAT SOLDER TABS

Prolonged/excessive heating of solder tabs (motor or ESC) will cause damage.

- C. Solder the ESC's **YELLOW Phase 'B'** motor wire to the motor's phase 'B' solder tab as described in Step 5B above.
- D. Solder the ESC's **ORANGE Phase 'C'** motor wire to the motor's phase 'C' solder tab as described in Step 5B above.

**Note: Make sure no wire strands have strayed to an adjacent solder tab, this will result in short-circuiting & severe ESC damage, which will void the warranty.**

### 6. CONNECT MOTOR'S SENSOR HARNESS TO ESC

Insert the 6-pin connector on the end of the motor's Teflon sensor wires into ESC's sensor harness socket--the connector is keyed and will only go together in one direction. *Spiral wrap can be used to protect sensor wires.*

### 7. CONNECT SPEED CONTROL TO BATTERY PACK

Connect the speed control's Tamiya-style JST battery connector to a charged 4 to 7 cell (1.2VDC/cell) or 2-cell LiPo battery pack.

### BRUSH-TYPE MOTORS (Fig.5-8)

Red LED flashes 4 times at start-up when transmitter signal is present & ESC is in Brush-Mode

### 1. DISCONNECT BRUSHLESS MOTOR SENSOR HARNESS

The XBR automatically switches to Brush-Mode when the ESC power is switched ON and no brushless sensor harness is connected.

### 2. MOTOR CAPACITORS

Electric brush-type 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.

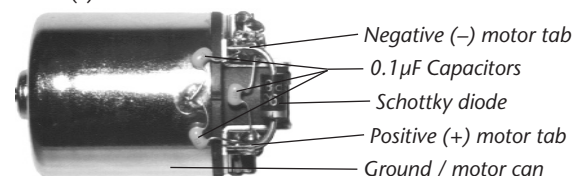
*Note: Some motors come with built-in capacitors. If your motor only has 2 capacitors, you need to install a capacitor between the positive & negative motor tabs--If you experience radio interference with built-in capacitors only, install external ones.*

#### Solder 0.1µF (50V) capacitors between:

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

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

FIGURE 5



### 3. INSTALLING OPTIONAL SCHOTTKY DIODE (Brush-Mode Only)

The XBR Sport does not require an external Schottky diode under most brush motor conditions. Note that an external Schottky will optimize the ESC's braking and motor performance in applications with heavy or repeated braking (lap after lap), or when using lower turn modified motors.

- If using an axial lead Schottky diode as shown in the photo above (older Novak style--35V/8A min.), solder lead **CLOSEST to the silver stripe** on the Schottky diode's body to the **POSITIVE (+) Motor Tab**. Solder the lead **OPPOSITE the silver stripe** on the body to the **NEGATIVE (-) Motor Tab**.
- If using the Novak Racing Schottky Motor Module (this is the best performing Schottky diode available), solder the **RED wire** from the module to the **POSITIVE (+) Motor Tab**. Solder the **BLACK wire** from the Schottky module to the **NEGATIVE (-) Motor Tab**.

*If Schottky diode is installed backwards it will be destroyed. Replace only with Schottky diodes with a minimum rating of 35 volts/8 amps.*

### 4. SPEED CONTROL'S RED WIRE CONNECTION

To use the XBR Sport with brush-type motors, the **RED** power wire going to **Battery POSITIVE (+)**, must also go to the **POSITIVE (+) Motor Tab**. There are two ways of doing this, as described below:

Y WIRING METHOD

*This method allows you to continue using stick pack batteries with the factory-installed connector, but can also be used with hard-wired installations. (Figure 6)*

- Strip about 1/4" of insulation from the end of the included extra piece of **RED** silicone power. Tin the exposed section of wire with solder.
- Solder this wire to the bottom of the ESC's **Battery POSITIVE (+) solder tab**, as shown in Figure 7 inset photo. *Be sure no strands of wire or solder short-circuit over the gap to the battery negative solder tab.*
- Determine the proper length for this new **RED** power wire to reach the **POSITIVE (+) Motor Tab** and cut it to this length. Strip & tin the end of the wire and solder it to the **POSITIVE (+) Motor Tab**.

SINGLE WIRE METHOD

*This method requires a hard-wired installation & has lower voltage losses. (Figure 7)*

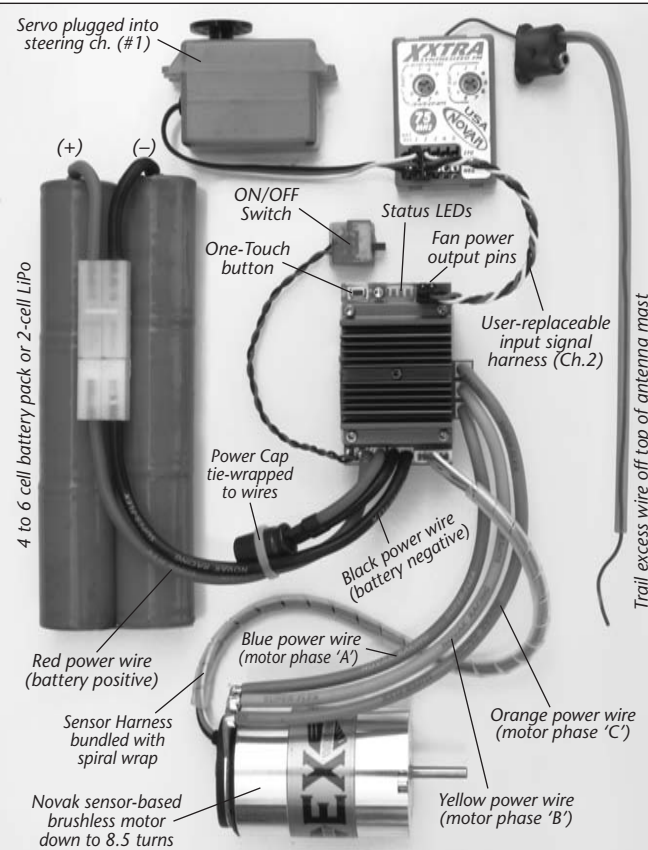
- Strip 1/4-3/8" piece of insulation from the mid-section of the ESC's **RED** silicone power wire where you will solder it to either **Battery Pack POSITIVE (+)** or the **POSITIVE (+) Motor Tab** (whatever component is in the middle). Tin the exposed section of wire with solder.
- Solder the exposed section of the ESC's power wire to **Battery Pack POSITIVE (+)** or the **POSITIVE (+) Motor Tab** (component in middle).
- Strip & tin the end of the ESC's **RED** power wire (after the first connection), and solder it to the final component--either **Battery Pack Positive (+)** or the **Positive (+) Motor Tab**.
- Strip & tin the end of the ESC's **BLACK** power wire, and solder it to **Battery Pack Negative (-)**.

### 5. PREP & SOLDER ESC'S BLUE, YELLOW, & ORANGE WIRES

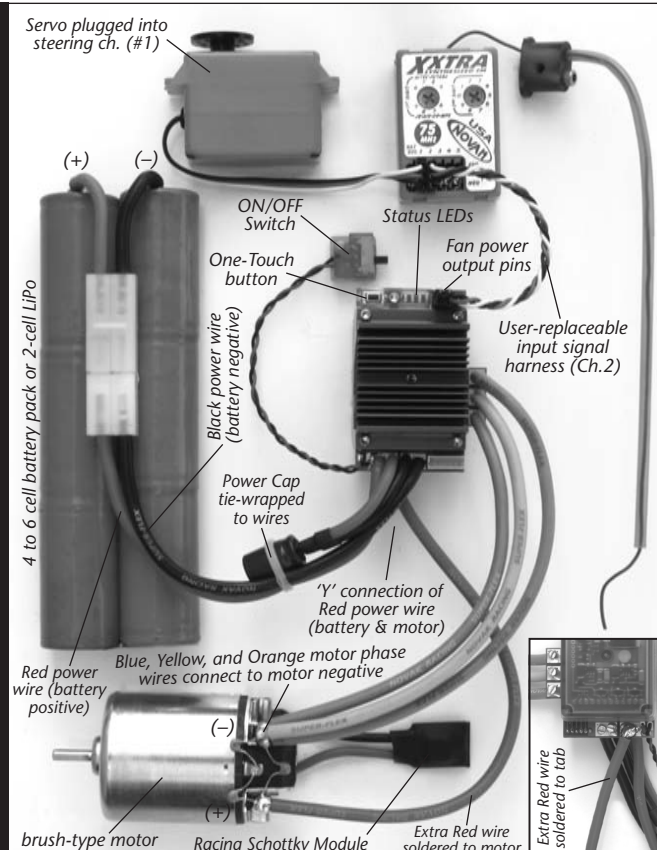
With brush-type motors, the XBR Sport's **BLUE, YELLOW, & ORANGE** motor phase power wires must all go to the **NEGATIVE (-) Motor Tab**.

- Strip 1/4" of insulation from the end of the **BLUE, YELLOW, & ORANGE** motor phase wires. Twist & tin the end of each of the wires.
- Solder all of the motor phase wires (**BLUE, YELLOW, & ORANGE**) to the **NEGATIVE (-) Motor Tab**.

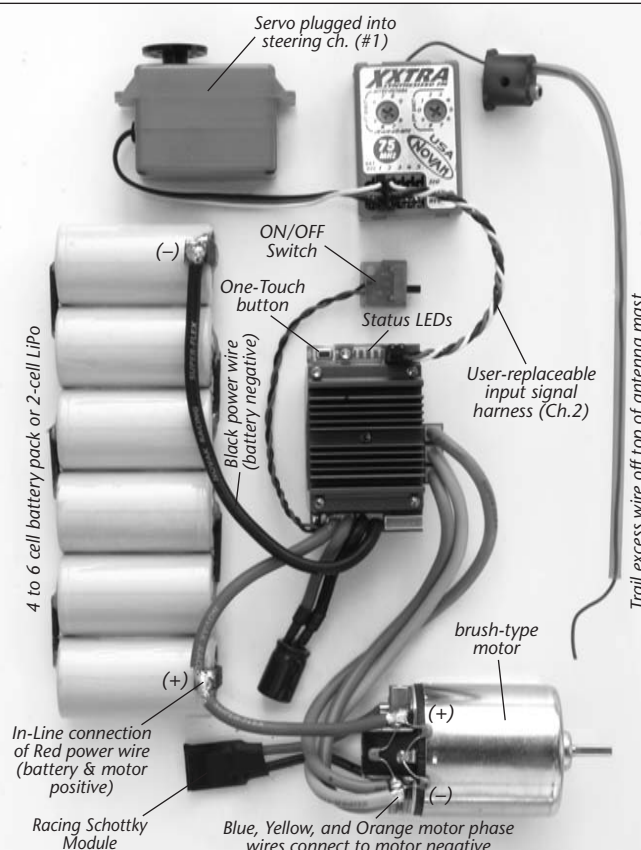
## BRUSHLESS-MODE SET-UP PHOTO (FIGURE 4)



## BRUSH-MODE SET-UP PHOTO 1 'Y' Method (FIGURE 6)



## BRUSH-MODE SET-UP PHOTO 2 Single Wire Method (FIGURE 7)



## CONNECTORS & WIRING HINTS

If you are going to use connectors, we suggest low-loss connectors (do not use crimp type) like Dean's Ultra. To prevent cross-connection of motor phase wires, we do not recommend using connectors on the motor power wires of sensor-based brushless motors.

- Use polarized connectors. Reverse voltage will damage the ESC & void warranty.
- Use a female connector on battery packs to avoid shorting.

When wiring the vehicle's electronics, short wires & clean/neat installations will give you better performance, higher efficiency, & less radio problems (glitching, etc.). Try your best to keep power wires away from signal wires & receiver/antenna.

## STEP 3-ESC MOUNTING

Mount ESC with power wires away from other electronics & moving parts. Select a location that allows airflow through heat sinks--If the ESC gets air flow, it will run cooler; and that means it will be more efficient, and you will go faster!

### 1. MOUNT SPEED CONTROL IN VEHICLE

Use the included double-sided tape to mount ESC in vehicle (do not glue). Avoid contact with side walls or other components to minimize vibration. 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. SECURE POWER CAPACITOR TO CHASSIS

Use included double-sided tape, or a tie-wrap, to mount Power Capacitor to the vehicle's chassis or shock tower. Capacitor can also be tie-wrapped along the power wires--this requires less space on the chassis.

### 3. INSTALL ON/OFF SWITCH

Use a screw or the included double-sided tape, and mount the switch where it will be easy to access--be sure to select a position where it will not get damaged or get switched OFF during a crash or roll-over.