

## STEP 5-ONE-TOUCH PROGRAMMING

With ESC connected to (at least) a receiver & fully-charged batteries:

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 ESC is at neutral, and proper programming has been completed (blue & amber LEDs may also be on).

Your HV Brushless System is now Ready-To-Run!

NOTE: If transmitter settings are changed, programming must be repeated. If you experience any problems, turn off ESC and repeat programming.

The HV Pro ESC has 3 built-in throttle profiles (2 w/reverse & 1 without) plus complete programmability of several ESC parameters to let you fine-tune the speed control just the way you want it.

See the included Custom Programming & Gearing sheet for more details.

## TRANSMITTER ADJUSTMENTS

If you have any problems with Step 5, adjust transmitter as follows, and then repeat the One-Touch programming in Step 5:

- 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 (or 5:5).  
[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.  
[adjusts trigger throw on mechanical/analog pistol-grip transmitters]

NOT ALL TRANSMITTERS HAVE THESE ADJUSTMENTS.

# Novak Electronics, Inc.

17032 Armstrong Avenue

Irvine, CA 92614

(949) 833-8873 • FAX (949) 833-1631

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

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

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



## USING A RECEIVER BATTERY PACK

If using an external receiver battery pack with the HV Pro ESC:

1. Plug an external 5 cell (1.2VDC/cell) receiver battery pack into the battery slot of the receiver.
2. Leave the HV Pro'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.

**12VDC BATTERY NOTE:** An external receiver battery pack must be used when using the HV Pro with a single 12 volt battery, like a lead acid or gel cell. The ESC's built-in B.E.C. will not provide enough output due to the high voltage directed through the single battery input, resulting in degraded servo/receiver performance and B.E.C. over-heating & failure.

## TROUBLE-SHOOTING GUIDE

Steering Channel Works But Motor Will Not Run

- LiPo Cut-Off Circuitry activated—Disconnect LiPo battery pack and re-charge.
- LiPo Cut-Off Circuitry is active & you are using NiMH batteries. Circuitry will cut throttle output very early into the run if you are using NiMH cells—Turn off LiPo Cut-Off.
- Red status LED blinking when throttle is applied. Check motor sensor harness connection at ESC (make sure all metal sockets are fully inserted into the connector's plastic housing)—check for damaged wires.
- Green & red status LEDs both on solid. Check input signal harness is plugged into ESC & receiver throttle channel. Check throttle channel operation with a servo. Check receiver signal harness wiring sequence.
- Green & red status LEDs blinking. LiPo Cut-Off Circuitry's safety cut-off voltage has been reached—replace battery pack with a fully charged one.
- 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 due to thermal overload or locked rotor detection & ESC's neutral point is too far off to sense throttle has been returned to neutral—Refer to Steps 5 & 6.
- 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.
- External Power Capacitor damaged/not installed—Replace Power Trans-Cap Module.

Motor and Steering Servo Do Not Work

- Check wires, receiver signal harness wiring & color sequence, radio system, crystals, battery/motor connectors, & battery pack.
- 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 transmitter/ESC adjustment—Refer to 'TRANSMITTER ADJUSTMENTS'.
- External Power Capacitor damaged/not installed—Replace Power Trans-Cap Module.

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 in your speed control or brushless motor system 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 & pricing by the following:

**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.

**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/motors 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.

# HV PRO BASIC SET-UP GUIDE

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



## SPECIFICATIONS

Input Voltage--NiMH .....	6-14 cells (1.2 volts DC/cell)
Input Voltage--LiPo .....	2-4 cells (2S to 4S)
ESC Footprint .....	1.75" x 2.17" [44.5 x 55.1mm]
ESC Weight (w/o wires).....	4.76 ounce [135 grams]
On-Resistance (Transistors @ 25°C) .....	0.0013 x 2 Ω
Rated Current (Transistors @ 25°C) .....	400 amps [per phase]
Power Wire (battery/motor) .....	14G Super-Flex Silicone
B.E.C. Voltage.....	6.0 volts DC
B.E.C. Current .....	3.0 amps
Motor Limit .....	Any Novak Sensor-Based 550-size Brushless
Motor Commutation .....	Sensor-Based Electronic
LiPo Cut-Off Voltage (automatic).....	6.25V (2S), 9.375 (3S), 12.5V (4S)
Throttle Profiles .....	3 (2 w/Reverse & 1 without)

### High-voltage/high-power brushless plus complete programmability!

The HV Pro brushless system is the perfect high-power reversible electronic speed control & sensor-based brushless motor upgrade for big trucks, hot boats, & other high-power R/C applications where you want all the benefits of brushless motors plus smoother throttle response & the best efficiency!

The HV Pro features full programmability, built-in LiPo Cut-Off Circuitry, & Novak's Smart Braking II (you don't go into reverse until you shift into reverse by returning the trigger to neutral & 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, & Radio Priority circuitry for the ultimate in control, right down to the end of the battery. Add to this the included Power-Boost ESC Cooling Fan kit & factory-installed motor heat sink, and the HV Pro is ready for anything!

• To benefit from all of the HV Pro's extensive technical features, PLEASE READ ALL INSTRUCTIONS CAREFULLY •

## OPTIONAL ACCESSORIES

5100 5mm Mod 1 Pinion Gear--Hardened steel pinion gear for 5mm shaft motors (11T).  
5101 5mm Mod 1 Pinion Gear--Hardened steel pinion gear for 5mm shaft motors (12T).  
5102 5mm Mod 1 Pinion Gear--Hardened steel pinion gear for 5mm shaft motors (13T).  
5103 5mm Mod 1 Pinion Gear--Hardened steel pinion gear for 5mm shaft motors (14T).  
5104 5mm Mod 1 Pinion Gear--Hardened steel pinion gear for 5mm shaft motors (15T).  
5105 5mm Mod 1 Pinion Gear--Hardened steel pinion gear for 5mm shaft motors (16T).  
5109 5mm Mod 1 Pinion Gear--Hardened steel pinion gear for 5mm shaft motors (9T).  
5110 5mm Mod 1 Pinion Gear--Hardened steel pinion gear for 5mm shaft motors (10T).

5152 5mm 32 Pitch Pinion Gear--Nickel plated steel pinion gear for 5mm shaft motors (12T).  
5153 5mm 32 Pitch Pinion Gear--Nickel plated steel pinion gear for 5mm shaft motors (13T).  
5154 5mm 32 Pitch Pinion Gear--Nickel plated steel pinion gear for 5mm shaft motors (14T).  
5155 5mm 32 Pitch Pinion Gear--Nickel plated steel pinion gear for 5mm shaft motors (15T).  
5156 5mm 32 Pitch Pinion Gear--Nickel plated steel pinion gear for 5mm shaft motors (16T).  
5157 5mm 32 Pitch Pinion Gear--Nickel plated steel pinion gear for 5mm shaft motors (17T).

5315 User-Replaceable Input Signal Harness--4.5"--Replacement plug-in input signal harness.  
5315 User-Replaceable Input Signal Harness--9"--Replacement plug-in input signal harness.

5412 HV Brushless Motor Heat Sink--Replacement slide-on heat sink for 550-size motor.  
5463 3-Amp High-Voltage Universal BEC--Universal external high-voltage B.E.C. module.

5508 14GA Brushless Wire Set--2 pieces each of 9" silicone blue, yellow, orange, black, & red.  
5512 12GA Silicone Power Wire Set--3' each of black, red, & blue silicone Super-Flex wire.  
5514 14GA Silicone Power Wire Set--3' each of black, red, & blue silicone Super-Flex wire.

5600 ESC Switch Harness--Replacement ON/OFF switch harness for speed controls.  
5611 Dual Cooling Fan Y-Harness--Harness for connecting 2 cooling fans to Novak ESCs.  
5644 Cooling Fan--40x40x10mm black--Cooling fan with 2-pin JST connector. Fits HV ESC.  
5645 Power-Boost ESC Cooling Fan Kit--40x40x10mm black cooling fan with mounting bracket.  
5684 Power Trans-Cap Module--2700µF/25V--Replacement HV power capacitor module.

5730 3.5mm Power Connectors--2 pair--Gold plated low-loss 12-14G power connectors.  
5731 3.5mm Power Connectors--5 pair--Gold plated low-loss 12-14G power connectors.  
5732 3.5mm Power Connectors--12 male--Gold plated low-loss 12-14G power connectors.  
5733 3.5mm Power Connectors--12 female--Gold plated low-loss 12-14G power connectors.  
5740 4mm Hi-Amp Connectors--2 pair--Gold plated low-loss 12-14G heavy duty connectors.  
5741 4mm Hi-Amp Connectors--5 pair--Gold plated low-loss 12-14G heavy duty connectors.  
5742 4mm Hi-Amp Connectors--12 male--Gold plated low-loss 12-14G heavy duty connectors.  
5743 4mm Hi-Amp Connectors--12 female--Gold plated low-loss 12-14G heavy duty connectors.

5810 Gold Battery Cross Bars--7pcs--Gold plated oxygen-free copper battery bars.  
5811 Gold Battery Cross Bars--28pcs--Gold plated oxygen-free copper battery bars.  
5820 Silver Battery Cross Bars--7pcs--Oxygen-free copper battery bars. Plated for easy soldering.  
5821 Silver Battery Cross Bars--28pcs--Oxygen-free copper battery bars. Plated for easy soldering.  
5831 Lead-Free 3% Silver Solder--6g--Low-resistance, high-conductivity solder.  
5832 Lead-Free 3% Silver Solder--15g--Low-resistance, high-conductivity solder.  
5833 Lead-Free 3% Silver Solder--100g--Low-resistance, high-conductivity solder.  
5840 Double-Sided Mounting Tape--10pcs--1"x1" high-performance clear mounting tape.  
5841 Double-Sided Mounting Tape--100pcs--1"x1" high-performance clear mounting tape.

5912 HV Sintered Rotor--1/8"--Sintered neodymium rotor for 1/8" shaft HV-series motors.  
5914 HV Sintered Rotor--5mm--Sintered neodymium rotor for 5mm shaft HV-series motors.  
5917 Ribbed End Bell & Bearings--5mm--Front end bell & bearings for 5mm shaft HV motors.  
5919 Ribbed End Bell & Bearings--1/8"--Front end bell & bearings for 1/8" shaft HV motors.  
5931 550-Size Motor Hardware Kit--Replacement shims & screws for 550-size Novak motors.

## PRECAUTIONS

**WATER & ELECTRONICS DON'T MIX!**  
Never expose ESC to water, moisture, or other foreign materials. Water damage voids the warranty!

**DISCONNECT BATTERIES WHEN NOT IN USE**  
Disconnect battery packs from ESC when not in use to avoid short circuits & possible fire hazard.

**6 TO 14 CELLS OR 2-4 CELL LiPo ONLY**  
NiMH--NEVER use fewer than 6 or more than 14 cells (1.2V/cell) & be sure LiPo Cut-Off is turned OFF.  
LiPo--Use dual 2-cell (2S) packs for main battery & be sure the LiPo Cut-Off option is turned ON.

**NOVAK MOTORS ONLY**  
The HV Pro ESC is specially designed for use with sensor-based Novak HV-Series 550-size Brushless Motors Only! Novak 540-size motors should not be used.

**NEVER FREE-REV THE MOTOR!!!**  
Free-running your brushless motor in a no-load condition can result in rotor failure and speed control transistor damage & will void the product's warranty!

**NO REVERSE VOLTAGE!**  
Reverse battery polarity can damage ESC & void warranty. Disconnect battery immediately.

**ALWAYS USE ESC HEAT SINKS & FAN**  
ESC heat sinks MUST be used (and included fan should be used) for optimum cooling. Allowing individual heat sinks to touch each other or any conductive surface will short circuit & damage ESC.

**POWER CAPACITOR REQUIRED**  
The HV Pro's factory-installed external Power Trans-Cap Module MUST be used.  
Failure to use PowerCap Module will result in higher ESC temperatures & thermal shut-down.

**TRANSMITTER POWER ON FIRST**  
Always turn on transmitter power first so 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 affect radio system performance.

**INSULATE EXPOSED WIRES**  
Use heat shrink tubing or electrical tape to insulate exposed wiring & prevent short circuits.

**NO CA GLUE ON ESC**  
CA glue & its fumes can damage internal ESC components and result in premature failure.

## PRODUCT WARRANTY

The HV Pro 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 6 or more than 14 cells (1.2 volts DC/cell) or more than 4 LiPo cells (4S) input voltage, cross-connection of battery/motor power wires, overheating solder tabs, reverse voltage application, damage resulting from thermal overload, short-circuiting or free-revving motor, 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, 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 natural disaster.

Because Novak Electronics 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.

©2008 Novak Electronics, Inc. • All Rights Reserved • No part of these instructions may be reproduced without the written permission of Novak Electronics, Inc. • HV Pro ESC, Smart Braking II, Polar Drive Technology, Radio Priority Circuitry, & One-Touch Set-Up are all trademarks of Novak Electronics, Inc.

## STEP 1-CONNECT INPUT HARNESS

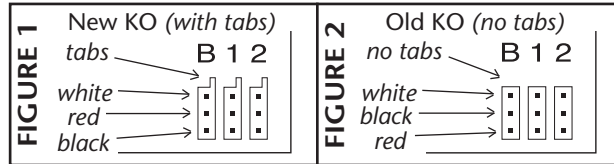
The HV Pro has a user-replaceable input harness with the industry-standard receiver connector on it & **works with all major radio brand's new receivers**. However, some very old receivers must have the wiring sequence in the plastic 3-pin JST connector housing changed on the receiver end. **This is important, as the 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.

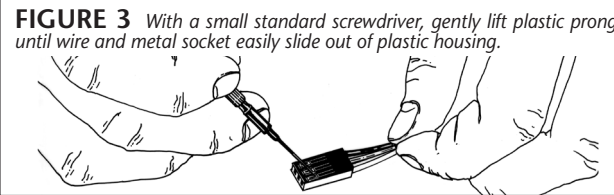
- Plug one end of the input signal harness into the THROTTLE CHANNEL (#2) of receiver with the **BLACK wire toward the outside edge** of receiver case.
- Plug the other end of input harness into 3-pin header in the rectangular opening on ESC's case with the **WHITE wire toward the 'S' marking** on the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



#### 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 on the receiver end--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 JST connector 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 label.



## STEP 2-MOUNTING ESC

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

**For single battery pack use, proceed to STEP 4 before completing STEPS 2 & 3**

- MOUNT ESC IN VEHICLE** using the included double-sided tape or with screws through the mounting ears on the sides of the case [the included #4x1" self-tapping screws fit the original ESC mounting in many vehicles--go through the fan mount bracket, then ESC mounting ears, & into chassis].
- PLUG COOLING FAN INTO ESC'S FAN POWER OUTPUT JACK** Remove rubber plug from ESC's fan power output jack located directly above the input signal harness opening (see Fig.5 below/right). Plug the connector on the fan harness into the power output jack (Note polarity: RED = +).
- INSTALL FAN BRACKET ONTO ESC (when using tape to mount ESC)** using included #6x5/8" self-tapping screws. Position fan bracket on ESC so that the holes for attaching the fan to the bracket are towards ESC front.
- INSTALL COOLING FAN ONTO BRACKET** using the included 4-40x1/2" socket head screws. Position fan so it is directly over the ESC's heat sinks & thread screws into the 2 holes on the top of the fan mount bracket.
- INSTALL ESC ON/OFF SWITCH** using a screw or double-sided tape where it will be easy to access [in many vehicles you can screw the switch into one of the holes that held the original switch].
- CONNECT ESC TO RECEIVER**--Configure input harness wires as described in Step 1 & connect ESC to the THROTTLE CHANNEL (#2) of receiver. 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).

## STEP 3-MOTOR INSTALLATION

### 1. MOTOR CAPACITORS NOT NEEDED

Novak brushless motors do not require external motor capacitors.

### 2. DO NOT USE SCHOTTKY DIODES

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

### 3. FACTORY-INSTALLED POWER CAPACITOR REQUIRED

#### WHY YOU WANT A POWER CAPACITOR

The HV Pro comes with a high-quality Power Trans-Cap Module that drops ESC operating temperatures by 10-15°F (cooler = more efficient = faster) and dissipates RF noise & voltage spikes caused by the ESC's high switching speed.

You MUST use Novak Power Capacitors (one part of Power Trans-Cap Modules)! Other capacitors with similar ratings don't provide equal protection. We've done extensive research to find capacitors with the very best quality factors.

#### MOUNTING THE POWER CAPACITOR:

Mount the Power Trans-Cap Module to the vehicle's chassis using the included double-sided tape or tie-wraps. You can also tie-wrap it to the ESC's battery wires if there is limited room on the chassis.

If Power Cap. becomes dented or damaged, ESC failure can occur--replace it immediately. Longer Power Capacitor wires decrease performance.

### 4. INSTALL PINION GEAR

refer to 'PROPER GEAR SELECTION' section (P5) of Programming & Gearing sheet to determine the proper gearing

After selecting proper final gear ratio, install pinion gear (usually about 6-8 teeth smaller than stock) on motor and position set-screw over the flat on the end of the motor shaft. Test fit motor in vehicle to align pinion and spur gears, then tighten pinion gear on shaft.

### 5. CHECK MOTOR SCREW LENGTH

You must check the length of the motor screw to ensure that the motor will not be damaged. You should have no more than 1/8" of screw extending past the vehicle's motor mounting plate (2-4mm). Too little can strip the threads in the end bell, and any more will cause damage & short-circuiting inside the motor & will void warranty.

continued ↑

Motor Installation: continued

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

Determine the best place to route the sensor harness (away from drive train & suspension). Insert the harness' 6-pin connector into the ESC's sensor harness socket--the connector is keyed & only goes in one way.

### 7. INSTALL MOTOR IN VEHICLE

For most applications, the HV Pro ESC & brushless motor can be installed in the vehicle without any modification to the motor wiring.

- Attach motor to the vehicle's motor mount with included M3 motor screws, using one of the sets of threaded mounting holes in the front end bell--select a mounting position that will avoid short-circuiting of motor's solder tabs against conductive surfaces like aluminum or graphite.

The HV motor included in HV Pro brushless motor systems comes with a slide-on heat sink factory-installed on it for extra cooling under excessive loads [in some vehicles the heat sink may need a small section of cooling fins removed to properly fit next to the vehicle's transmission]. Rotate the heat sink on the motor as needed for proper fit--beware of any wires crossing the heat sink's sharp edges, as short-circuiting may occur.

- Check gear mesh for proper free play. You want to have a small amount of play between the pinion & spur gears (about the thickness of a piece of paper)--check free play at several positions around the spur gear.
- Tighten motor into position once desired gear mesh has been adjusted--avoid using excessive force when tightening motor screws, as the threaded holes could become stripped.
- For vehicles that originally used 2 motors, use the included motor hole cover in place of the 2nd motor (this will help keep debris out of the slipper and the gears). Install motor hole cover using the vehicle's original motor screws or with two 4-40x1/4" screws.
- Replace any parts of the vehicle that were removed to install the motor--motor/gear covers, etc.
- Determine best routing for the motor's power wires. If your vehicle requires unsoldering motor to route power wires through the shock tower or chassis, refer to "REPLACING POWER WIRES AT ESC & MOTOR" on Programming/Gearing Sheet.

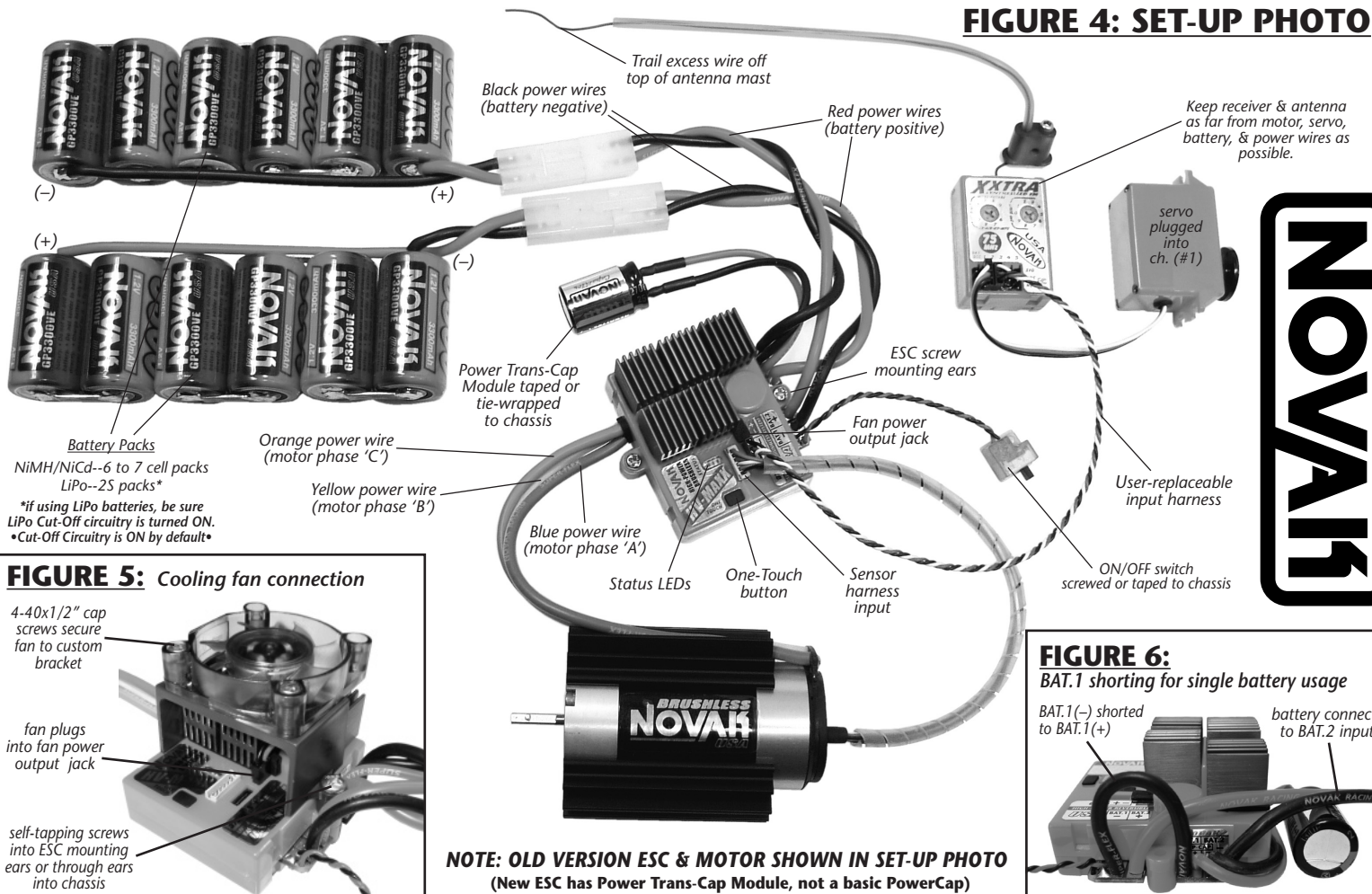
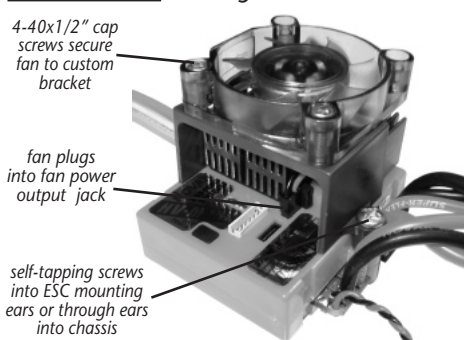
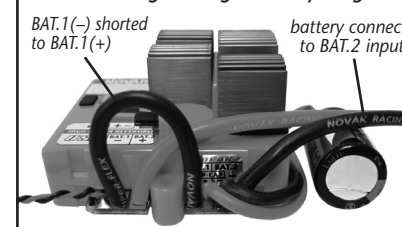


FIGURE 4: SET-UP PHOTO

### FIGURE 5: Cooling fan connection



### FIGURE 6: BAT.1 shorting for single battery usage



NOTE: OLD VERSION ESC & MOTOR SHOWN IN SET-UP PHOTO (New ESC has Power Trans-Cap Module, not a basic PowerCap)

## STEP 4-BATTERY CONNECTION

The HV Pro is very powerful, and capable of very efficient delivery of battery power to its brushless motor. Therefore, good connections must be made between the battery, speed control, and motor.

A common cause of performance problems and speed control failures is poor connections--If you have any doubts about your soldering skill, we suggest seeking assistance at your hobby shop or track.

With the HV Pro ESC & motor installed, it's time for battery connections. The HV Pro ESC is factory-wired for two battery packs with JST/Tamiya-style battery connectors for use with sport battery packs.

When using the HV Pro in monster trucks or other heavy, high-power vehicles, we strongly suggest replacing the battery connectors with ones that are capable of handling higher current. We recommend using the Novak Low-Loss Power Connectors or the Deans® Ultra Plug™.

### BATTERY PACK CONNECTIONS

The HV Pro system is designed to be used with two battery packs. However, it can also be used with a single battery pack ranging from 6 NiMH cells (1.2VDC/cell) or 2S LiPo, up to 14 NiMH cells (or 4S LiPo) or a 12 volt DC battery or gel cell. Using the HV Pro with a single battery requires special wiring and is discussed below.

### USING DUAL BATTERY PACKS:

- Connect one battery pack (6-7 cells @ 1.2VDC/cell or 2S LiPo) to the JST/Tamiya connector at the end of the red & black wires coming from the ESC's BAT.1 solder tabs as marked on ESC's case labels.
- Connect a second battery pack to the JST/Tamiya connector coming from the ESC's BAT.2 solder tabs.
- If using NiMH or NiCd batteries, disable the LiPo Cut-Off Circuitry.

### USING A SINGLE BATTERY PACK:

To use the HV Pro with a single 6-14 cell NiMH pack, a 4S LiPo, or a 12VDC battery, the pack/battery must be connected to the BAT.2 input & the BAT.1 input must be shorted together (see Fig.6 below/left).

- Cut the black wire coming from the BAT.1 (-) solder tab (battery wire closest to the front of ESC) about 2-3" above the solder tab.
- Strip a 1/8-1/4" of insulation off the end of the BAT.1 (-) black wire. Tightly twist the strands of wire & lightly tin with solder. CAUTION: When making battery wire solder connections at the ESC's Direct-Solder Wiring Tabs, it is important to not overheat & damage PCB (printed circuit board) with the soldering iron by applying prolonged or excessive heating (PCB damage voids warranty).
- Remove the red wire from the BAT.1 (+) solder tab: Use a soldering iron to apply heat to the wire's solder joint while gently pulling on the wire to remove it from the PCB Board's hole.
- Solder the stripped & tinned end of the black wire coming from the ESC's BAT.1 (-) solder tab into the BAT.1 (+) solder tab: Insert the wire end into the BAT.1 (+) solder tab hole (if there is still solder in the hole you can melt it with the iron while pushing the wire through the hole). Apply heat to the section of wire that is sticking through the tab's hole, and add solder to the tip of the soldering iron and to the wire. Add just enough solder to form a clean & continuous joint from the plated area of the solder tab up onto the wire. Use side cutters to trim excess wire above tab (about 1/16").
- Connect battery pack (6-14 cells @ 1.2V/cell or 4S LiPo) to the JST/Tamiya connector at the end of the red & black wires coming from the ESC's BAT.2 solder tabs as marked on the HV-Maxx case labels.
- If using NiMH or NiCd batteries, disable the LiPo Cut-Off Circuitry.

### B.E.C. OUTPUT WHEN USING SINGLE BATTERY ABOVE 8.4VDC

When using a single battery above 8.4VDC (like a lead acid or gell cell), there is limited output from the B.E.C. circuit & you need to use a separate receiver battery pack. (refer to Using A Receiver Battery Pack section on P4)

## SENSOR HARNESS WIRING

Should any of the 26G Teflon wires pull out of the connector on 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 to the Teflon wire's end. The plastic tab should be checked to make sure it has not deformed excessively before inserting the socket into the plastic connector housing.

If the sensor harness gets damaged, contact our Customer Service Department.

