

# BASIC SET-UP GUIDE --- TIMBUK2 ESC

• See "ESC Track Guide" for Proper Gearing & Custom Programming • Read All Instructions Before Use •

**NOVAK**



## TIMBUK2



#55-1832-1.B  
1-2012

## SPECIFICATIONS

Input Voltage.....2S LiPo/LiFe cells, 4-7 NiMH cells  
Motor Limit (540-size).....13.5-turn sensor-based Novak brushless crawler  
Motor Limit (380-size).....Any sensor-based Novak brushless crawler  
ESC Size.....1.15" x 0.95" x 0.66"H (29.0 x 24.3 x 16.8mm)  
ESC Weight (w/o wires).....0.69 ounce (19.5 grams)  
B.E.C. Voltage/Current (built-in).....6.0 volts DC / 2.0 amps  
Power Wire (Battery/Motor).....14G Super-Flex Silicone  
On-Resistance.....0.00057ohm per phase @25°C trans.temp.

The Timbuk2 Brushless ESC includes 3 types of adjustable braking, on-board temperature monitoring, and Novak's exclusive Rock Boost™ that electronically advances the motor timing at full-throttle for explosive rock racing top speeds.

## ACCESSORIES

**PLUG-IN INPUT SIGNAL HARNESS (MINI-JST) [Novak kits #5304 & #5309]**  
Input signal harness with 2mm Mini plug on ESC end--4.5" (#5304), 9" (#5309).

**BRUSHLESS MOTOR CONNECTOR WIRE SET [Novak kit #5332]**  
Flexible 14GA wire with gold-plated connectors for low-resistance connections.

**BRUSHLESS SENSOR HARNESSES [Novak kit #5351-#5353]**  
Shielded sensor harness protects sensor wires--4" (#5351), 6" (#5352), 9" (#5353).

**5-AMP UNIVERSAL BEC (2S) [Novak kit #5465]**  
Supplies 6.0V / 5A of power to receiver & servo for extra performance under heavy loads.

**SUPER-FLEX SILICONE 14GA WIRE SET [Novak kit #5508]**  
Two each of 9" length black, red, blue, yellow, and orange 14GA wire.

**GLITCH BUSTER CAPACITOR [Novak kit #5626]**  
Supplies reserve power to receiver during spikes of heavy load to avoid drop-out.

**REPLACEMENT POWERCAP HARNESS [Novak kit #5682]**  
1000µF, 16V replacement PowerCap harness for Edge ESC.

**POWER CONNECTORS--3.5mm & 4mm [Novak kit #5731 & #5741]**  
Low-Loss connectors generate dozens of wiring routing and installation options.

**LEAD-FREE SILVER SOLDER [Novak kit #5831-#5833]**  
3% Silver solder for high-conductivity--6gr (#5831), 15gr (#5832), 100gr (#5833).

**MOUNTING TAPE 25x35mm [Novak kit #5840 & #5841]**  
Cushioned, double-sided tape for mounting electronics--10pc (#5840), 100pc (#5841).

**HEAT SHRINK TUBING [Novak kit #5850 & #5851]**  
6" long heat shrink tubing in six sizes: 1/16" - 3/8"--6pc kit (#5850), 24pc kit (#5851).

## PRODUCT WARRANTY

This Brushless ESC is guaranteed to be free from defects in materials or workmanship for a period of 120 days from original purchase date (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 more than 7 cells (1.2 volts DC/cell) or more than 2 LiPo/LiFe cells input voltage, damage resulting from using LiPo/LiFe batteries without Smart-Stop voltage cut-off circuitry active, using insufficient LiPo/LiFe batteries that cannot supply the amperage required by this system, cross-connection of battery/motor power wires, overheating solder tabs, reverse voltage application, improper use or installation of external BEC, damage resulting from thermal overload or short-circuiting motor, damage from incorrect installation of FET servo or receiver battery pack, damage due to free revving motor, damage due to using a non-Novak motor or a non-sensored motor, not using or incorrect installation of a PowerCap or Power Trans-Cap Module on ESC or operating ESC with a damaged PowerCap, using a Schottky diode, 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 has no control over connection & use of ESC 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 ESC & motor is thoroughly tested & cycled before leaving our facility and is, therefore, considered operational. By the act of connecting/operating ESC, 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. This product is not intended for use by children under 14 years of age without the strict supervision of an adult. Use of this product in an uncontrolled manner may result in physical damage or injuries--take extra care when operating any remote control vehicle. Melted ESCs/motors are not covered by the warranty.

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

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## PRECAUTIONS

### WATER & ELECTRONICS DON'T MIX!

Allowing water, moisture or other foreign materials to get inside ESC will void warranty.

### MUST BE 14 YEARS OR OLDER TO OPERATE

Strict adult supervision is required for use by children under 14 years of age.

### SENSOR-BASED BRUSHLESS MOTORS ONLY

Designed for use with 540 & 380-size sensor-based Novak brushless crawler motors.

**For optimal Rock Boost performance, earlier Novak Ballistic Crawler motors will need to have the mechanical timing of the motor set to 0°--Loosen bearing cap & adjust timing to where the sensor harness connector is directly in-line with the center (Phase B) solder tab.**

### NO SCHOTTKY DIODES!

Do not use Schottky diodes with brushless ESCs!

### DO NOT FREE REV OR OPERATE WITHOUT LOAD!

This includes running the motor without a pinion or holding the car in the air and running the motor at or close to full power. Free revving will void the warranty!

### 2S LiPo/LiFe OR 4-7 NiMH CELLS ONLY

NEVER exceed 2S LiPo/LiFe packs--Be sure Voltage Cut-Off option is turned ON (refer to Field Guide). For NiCd/NiMH, NEVER exceed 7-cells (1.2VDC/cell) & disable Voltage Cut-Off.

### DISCONNECT BATTERIES WHEN NOT IN USE

Always disconnect batteries from ESC to avoid short circuits and possible fire hazard.

### POWERCAP REQUIRED

An external PowerCap is installed on ESC & MUST be used at all times. Failure to use Novak PowerCap will result in higher ESC temperatures & possible damage.

### GOOD QUALITY LiPo/LiFe BATTERIES SUGGESTED

Using LiPo/LiFe batteries that cannot supply the amperage required by this system will result in possible battery, ESC, & motor damage, and will void the warranty.

### TRANSMITTER ON FIRST

Turn on transmitter power first so you will have control of vehicle when you turn it on.

### GOOD QUALITY RADIO SYSTEM SUGGESTED

Undesirable radio noise may occur when using lower quality radio systems. **2.4GHz radio system use is best;** high quality FM system is acceptable; AM systems are NOT recommended.

### DO NOT BUNDLE POWER & SIGNAL WIRES TOGETHER

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

### INSULATE WIRES & NO REVERSE VOLTAGE!

Insulate exposed wiring with heat shrink tubing or electrical tape to prevent short circuits, & never reverse connect the battery--ESC damage will occur & void warranty.

### NO CA GLUE

CA glue or fumes can damage internal components of ESC & cause premature failure.

## VOLTAGE CUT-OFF CIRCUITRY

When active, the built-in Smart-Stop Voltage Cut-Off Circuitry lets you safely use 2S Lithium Polymer (LiPo) or Lithium Iron Phosphate (LiFe) battery packs by cutting off the ESC's throttle output when the critical safety voltage is reached.

The circuitry monitors the battery voltage and automatically cuts-off the ESC's throttle when the voltage drops to **6.25V for 2S LiPo, or 4.75V for 2S LiFe**. As the ESC approaches the critical safety voltage, it begins interrupting, or "blipping" the throttle output as an early warning that the voltage is getting low and the throttle output will soon be completely shut off. When the critical voltage is reached, the ESC's throttle output gets completely shut down to keep the voltage from dropping further (Red & Yellow LEDs will alternately flash & you still have steering control).

### Re-charge battery after Smart-Stop circuitry shuts off throttle

Even though the pack's voltage will rise (after a short resting period) to a level high enough to run motor again, this is not good for LiPo or LiFe batteries.

Reaching critical safety voltage too many times can damage the cells.

### DO NOT RUN VEHICLE AFTER SMART-STOP HAS SHUT DOWN THROTTLE OUTPUT!

When the ESC is switched ON, the Yellow & Red LEDs will flash together 2 times to indicate LiPo/LiFe Cut-Off is ACTIVE.

With the Voltage Cut-Off turned ON & using NiCd/NiMH cells, the ESC's throttle output will shut off very early into the run--Change the Cut-Off Circuitry mode to OFF to use these batteries.

See CUSTOM PROGRAMMING OPTIONS on ESC Track Guide to properly adjust this setting.

## OPTIONAL RECEIVER PACK USAGE

To use an external receiver battery pack to power the electronics:

1. Plug the 5 cell (1.2VDC/cell) receiver pack into the battery slot of the receiver.
2. Switch the receiver pack ON. Next, turn the ESC's switch ON, then OFF to allow the ESC to be powered by the external power source.
3. Turn the receiver pack's switch OFF to turn the vehicle OFF.

### ALTERNATIVE METHOD

1. Plug the 5 cell (1.2 VDC/Cell) receiver pack into the battery slot of the receiver.
2. Unplug the ESC's red wire from input receiver harness (insulate the red wire).
3. To turn the vehicle ON, switch the receiver pack ON. Then, turn the ESC's switch ON.
4. To turn vehicle OFF, turn ESC's switch OFF, then turn receiver pack's switch OFF.

## STEP 1-MOUNT ESC

Mount the ESC so the power wires are as far away from other electronics as possible, and will not interfere with the vehicle's moving parts. Select a location with good airflow for cooling the ESC for efficient operation.

### 1. MOUNT SPEED CONTROL IN VEHICLE

Use the included double-sided tape to mount ESC in vehicle (*do not use glue*). Avoid contact with side walls or chassis components to avoid vibration damage.

**Be sure receiver & antenna are mounted as far from ESC, power wires, battery, and servo as possible--These components all emit RF noise.**

*Note: Mount antenna as close to receiver as possible--trail excess wire off top of antenna mast (cutting/coiling excess wire reduces radio range--2.4GHz too).*

### 2. INSTALL ON/OFF SWITCH

Use included double-sided tape to mount switch where it will be easy to access--select a place where it will not get damaged/switched OFF in a crash.

### 3. SECURE POWERCAP & POWER WIRES TO AVOID VIBRATION DAMAGE

Use the included tie-wraps to secure PowerCap to the ESC's power wires, the tie-wrap the power wires together or to a point on the vehicle.

## STEP 2-CONNECT MOTOR/BATTERY

### MOTOR CONNECTION

#### 1. SELECT PROPER MOTOR FOR OPTIMUM PERFORMANCE

The ESC's Rock Boost feature works best with Novak Ballistic Crawler brushless motors that are set to 0° mechanical timing--The Sensor harness opening on the back bearing cap should be directly inline with the Phase B solder tab.

#### 2. INSTALL PINION GEAR & ADJUST MOTOR FOR PROPER GEAR MESH

Tighten pinion's set screw on flat of motor shaft. Align pinion & spur gears.

A. You **NEED** a small amount of play between the pinion & spur gear (about thickness of a piece of paper)--**check free play at several points around spur gear to ensure a proper mesh (Make sure gear mesh is NOT TOO TIGHT).**

B. Tighten motor mounting screws--Avoid using excessive force that could break screws or strip the threaded holes in motor.

#### 3. CHECK FOR PROPER GEARING DURING INITIAL RUNS

Crawler motors/ESCs generally **DO NOT** get very hot--Lower the gearing or check drive train for binding/problems if you experience high temperatures.

#### 4. CONNECT MOTOR POWER PHASE WIRES TO MOTOR

A. Connect the ESC's **BLUE** Phase 'A' silicone motor power wire to the bullet connector on the motor's **BLUE** power wire.

B. Connect **YELLOW** Phase 'B' power wire to connector on motor's **YELLOW** wire.

C. Connect **ORANGE** Phase 'C' power wire to connector on motor's **ORANGE** wire.

#### 5. CONNECT MOTOR SENSOR HARNESS TO ESC

Insert the 6-pin connector of the motor's sensor harness into ESC's sensor harness socket--connector is keyed and only inserts in one direction.

### BATTERY CONNECTION

#### 1. CONNECT ESC'S BATTERY CONNECTOR TO BATTERY PACK

Connect the speed control's battery connector to a fully charged 2S LiPo, 2S LiFe, or 4-7 cell NiMH (1.2 VDC/cell) battery pack.

To change the battery connector on the ESC to a different type, we suggest using low-loss high power connectors like Dean's Ultra Plug.

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

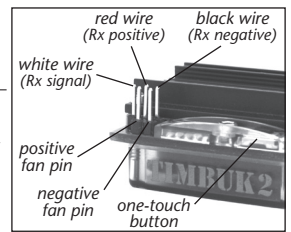
**NOTE: If using NiMH or LiFe batteries, the Voltage Cut-Off Circuitry must be programmed for the appropriate battery type (refer to ESC Track Guide).**

## STEP 3-CONNECT RECEIVER

### RECEIVER CONNECTION

The ESC has a user-replaceable input harness with a 2mm mini plug on ESC end of it and the industry-standard connector on receiver end.

**The ESC works with all major radio brand's new receivers.** Some very old receivers need the wiring sequence changed in the plastic 3-pin connector on the receiver end--Receiver/servo may be damaged if sequence is incorrect. For instructions on changing the wiring sequences on older receivers, visit our web site.



#### 1. CONNECT 2mm MINI PLUG TO RECEIVER HARNESS PINS ON ESC

Insert the 2mm mini plug of receiver input harness onto the receiver harness 3-pin header on the ESC. **White wire goes on the left side pin as shown above.**

#### 2. CONNECT RECEIVER HARNESS TO RECEIVER

Insert 3-pin connector of receiver harness into Ch.2 (throttle) slot of receiver.

## STEP 4-ONE-TOUCH PROGRAMMING

With ESC connected to a charged battery, receiver, & motor's sensor harness:

#### 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 at neutral (still pressing SET button), slide ESC's switch to ON position.

#### 4. CONTINUE HOLDING SET BUTTON UNTIL RED LED COMES ON

#### 5. RELEASE SET BUTTON AS SOON AS RED LED TURNS ON

6. **PULL TRANSMITTER THROTTLE TO FULL-ON POSITION** Hold it there until green status LED **turns solid green**. (Motor won't run during programming).

#### 7. PUSH TRANSMITTER THROTTLE TO FULL-BRAKE/REVERSE

Hold it there until the green status LED **blinks green**.

#### 8. RETURN TRANSMITTER THROTTLE TO NEUTRAL

The red status LED will **turn solid red**, indicating that speed control is at neutral and that proper programming has been completed. Blue & yellow LEDs will also be on indicating Minimum Brake (blue) & Drag Brake (yellow) settings are at levels above 0%.

*If transmitter settings are changed, the One-Touch Programming must be repeated. If you experience any problems, turn off ESC and repeat One-Touch.*

**NOTE: One-Touch Programming reverts ESC back to factory-default settings.**

## TRANSMITTER ADJUSTMENTS

Transmitter adjustments may not be required to properly complete the One-Touch programming. If you have any problems with the programming, adjust your transmitter settings as listed below and repeat **ONE-TOUCH PROGRAMMING**.

### THROTTLE CHANNEL ADJUSTMENTS

A. Set **HIGH ATV** or **EPA** to **100%**. [amount of throw at full throttle]

B. Set **LOW ATV**, **EPA**, or **ATL** to **100%**. [amount of throw at full brakes]

C. Set **EXPONENTIAL** to **zero** setting. [throttle channel linearity]

D. Set **THROTTLE CHANNEL REVERSING SWITCH** to either position.

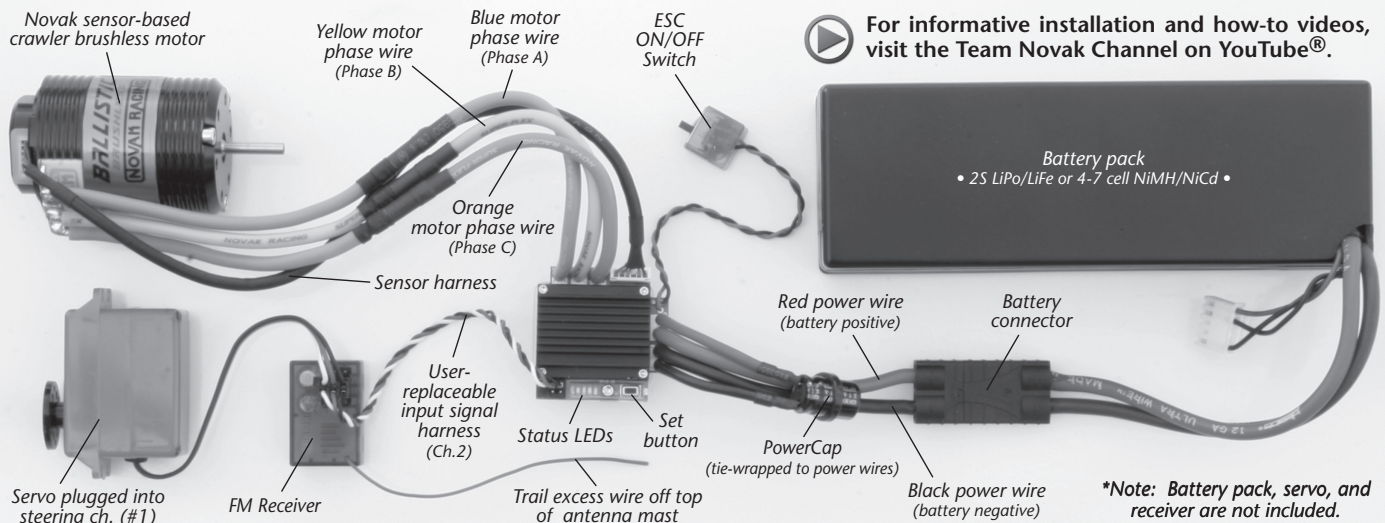
E. Set **THROTTLE CHANNEL TRIM** to **middle**. [adjusts neutral position]

F. Set **ELECTRONIC TRIGGER THROW** to **70% throttle/30% brake** (or 7:3)--best for racing. Set to 50%/50% for full time use with reverse for best performance.

G. Set **MECHANICAL TRIGGER THROW** to 2/3 throttle and 1/3 brake throw position.

**•NOT ALL TRANSMITTERS HAVE ALL OF THESE ADJUSTMENTS•**

EDGE SET-UP PHOTO



For informative installation and how-to videos, visit the Team Novak Channel on YouTube®.

www.teamnovak.com