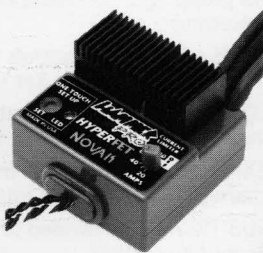


OPERATING INSTRUCTIONS

HAMMER PRO ESC



RACER ESC



INTRODUCING THE HAMMER AND RACER ESCs

The Novak Hammer Pro and Racer ESCs combine the simplicity of One-Touch Set-Up™, high frequency operation, huge 12 gauge silicone wire, and all-new CLC II™ current limiter circuitry to provide maximum power and driveability.

New features include Radio Priority Circuitry™ to maintain control of the radio even after the battery pack has "dumped", dual-level thermal protection, and digital glitch-prevention to reduce radio problems.

Other features include the Novak Input Plug System™, and exclusive Solid State RVP™ for maximum reverse voltage protection without the use of fuses.

ADDITIONAL SPECIFICATIONS

Voltage Input	4 to 10 Cells	
Case Size (w/o heat sinks)	1.63" x 1.72" x 0.65"	
Weight (w/o heat sinks)	2.43 oz.	
On-Resistance	0.0014 Ω (Hammer)	0.0030 Ω (Racer)
Rated Current	300 amps	
Braking Current	120 amps	
BEC Output	6.0 Volts/1.0 Amp	

IMPORTANT PRECAUTIONS

(ESC= ELECTRONIC SPEED CONTROL)

- Do not run near water! Never allow water, moisture, or any liquid to touch the ESC.
- Never use more than 10 cells.
- Do not mix instructions. If you are building a kit that has a mechanical speed control, do not use the wiring diagram included with the kit.
- Never cut or splice the ESC input harness wires.
- Nothing should be plugged into the BATTERY slot of the receiver.
- Three 0.1μF (50 V) ceramic capacitors must be properly installed on every motor.
- A Schottky diode must be properly installed on every motor.
- Never allow the heat sinks to touch each other or any exposed metal.
- Always disconnect the battery pack from the ESC when not in use.
- Never turn on the ESC before plugging it into the receiver and switching on the transmitter.
- Do not touch the heat sinks when they are hot.

PLEASE FOLLOW ALL INSTRUCTIONS CAREFULLY

PREVENTING RADIO PROBLEMS

Radio interference can cause the speed control to rapidly switch between forward and full brakes, causing overheating of the brake transistors and possible damage to the ESC. Here are a few of the most common causes of radio problems:

- **CAPACITORS NOT INSTALLED ON MOTOR** Electric motors generate radio noise that can interfere with the receiver. To prevent radio problems, every motor should have three 0.1μF (50V) ceramic capacitors installed (see back page).
- **RECEIVER MOUNTED ON GRAPHITE OR METAL CHASSIS** Graphite and metal chassis transmit radio noise generated by the motor. To prevent radio problems, mount the receiver on the rear shock tower or away from the chassis. If the receiver is mounted on the chassis, stand it on its side with the crystal as far away from the chassis as possible.
- **RECEIVER ANTENNA CUT OR MOUNTED WRONG** If the receiver's antenna is cut, the range will be reduced. The antenna should be mounted away from the motor and power wires. Coiling the antenna wire, or keeping the entire antenna inside the body will reduce the range and increase the risk of radio problems.

CURRENT LIMITER ADJUSTMENT

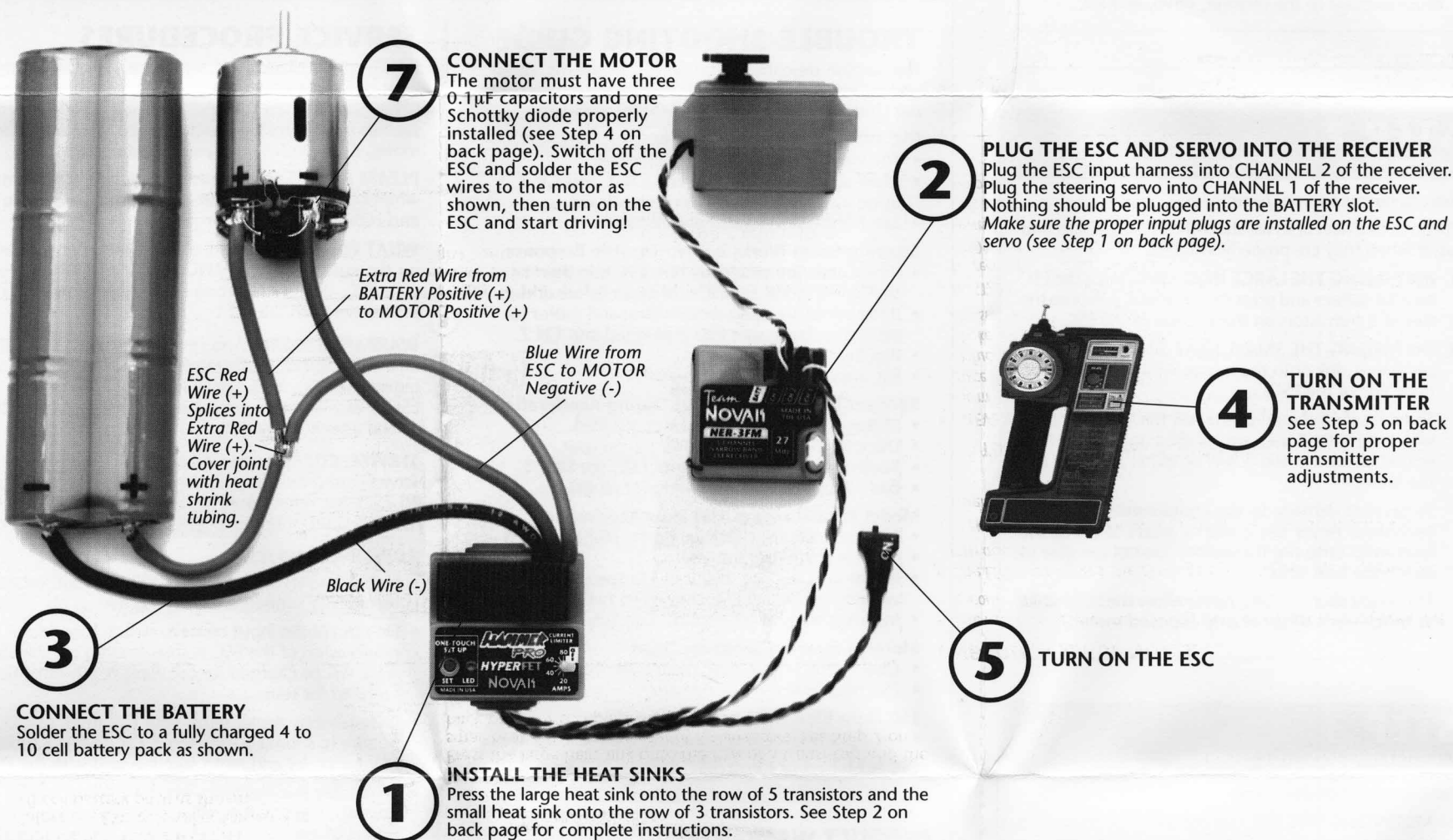
The Hammer Pro and Racer ESCs are equipped with CLC II current limiting circuitry. CLC II can be used to prevent excessive amp draw which wastes energy and overheats the batteries and motor. And, for slippery tracks, CLC II can be used as traction control.



New CLC II is smooth and efficient. The "OFF" position bypasses the current limiter for maximum punch. Setting CLC II is simple— just turn the knob to the desired maximum amp draw. Use practice time at the track to set the current limiter to match track conditions.

- **TO REDUCE WASTED ENERGY** We recommend starting at a high level and adjusting downward to suit the track conditions. The perfect setting is just above the point where the CLC II starts making the acceleration of the motor feel slower.
- **TO CONTROL TRACTION ON SLIPPERY TRACKS** We recommend starting at the lowest setting and adjusting upward. The perfect setting is just below the point where the car is difficult to control during acceleration.
- **FOR MAXIMUM PUNCH** Turn the knob to the "OFF" position and **HAMMER** the throttle!

QUICK SET-UP If necessary, refer to back page for more detailed instructions.



6 SET THE ESC FOLLOW STEPS A, B, AND C



A

With the transmitter throttle in the neutral position, press and hold the ESC "SET" button until the ESC light turns red, then release the "SET" button.



B

Pull full throttle on the transmitter and hold until the ESC light turns solid green.



C

Push and hold full brakes on the transmitter until the ESC light blinks green. Let the throttle return to neutral and wait until the ESC light turns solid red.

ONE-TOUCH SET-UP NOTES:

- The motor does not run during the Set-Up sequence (even if it is connected).
- The ESC memorizes the settings until the Set-Up sequence is run again.
- If the transmitter settings are changed, run the Set-Up sequence again.

PRO TUNING FOR ONE-TOUCH SET-UP:

- **PREVENTING BRAKE LOCK-UP** For slippery tracks, the maximum brake setting may cause the brakes to lock up. To reduce the amount of braking power, set the ESC normally, then reduce the LOW ATV/EPA/ATL setting on the transmitter. Make sure to return the setting to maximum before the Set-Up sequence is run again.
- **INSTANT-ON THROTTLE** For drag racing, some drivers want to reach maximum throttle quickly. To make the throttle reach 100% before the trigger is at 100%, hold the throttle at less than maximum during the Set-Up sequence. This setting is not recommended for applications requiring smooth throttle response.

STEP 1

CHANGING THE INPUT PLUG

If the factory-installed Futaba J style plug installed on the ESC is not compatible with your receiver, follow Figures 1-3 to change the input plug. The Novak Input Plug System™ will convert the ESC's input plug for use with Airtronics, KO, Kyosho, and JR radios.

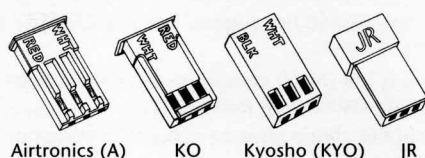


FIGURE 1 Using a small standard screwdriver, press each of the three metal locking tabs and remove each pin from the plug.

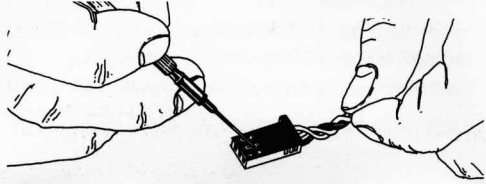


FIGURE 2 Using the screwdriver, carefully bend each of the metal locking tabs to the angle shown.

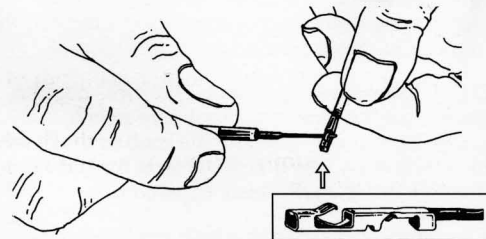
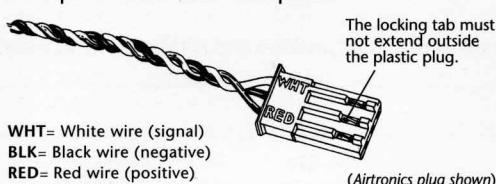


FIGURE 3 Insert each pin into the correct plug slot. Each pin should "click" into place.



CAUTION Improper installation of these wires may cause damage to the receiver, servo, and ESC.

STEP 2

HEAT SINK INSTALLATION

Refer to photos on front page

The included heat sinks will make the ESC run cooler and faster when they are properly installed.

1. INSTALLING THE LARGE HEAT SINK Place the ESC on a flat surface and press the large heat sink onto the row of 5 transistors on the left side of the ESC.

2. INSTALLING THE SMALL HEAT SINK Press the small heat sink onto the row of 3 transistors on the right side of the ESC.

The heat sinks should press onto the transistors with a snug fit. If they are installed upside-down or shifted off-center, the fit will be either too tight or too loose.

To prevent damage to the components under the transistors, **never use a vise or pliers to force the heat sinks onto the transistors.** Do not use glue to attach the heat sinks.

To prevent short-circuits, **never allow the heat sinks to touch each other or any exposed metal.**

STEP 3

MOUNTING INSTRUCTIONS

Refer to photos on front page

1. MOUNTING THE ESC Use the included mounting tape to mount the ESC in a location that provides maximum airflow through the heat sinks. For off-road cars, the ESC should be mounted on the chassis. Mount the ON/OFF switch in a convenient place with a piece of mounting tape.

2. MOUNTING THE RECEIVER To minimize glitching, mount the receiver and antenna at least two inches away from the ESC, motor, servo, power wires, or any large piece of metal such as a metal chassis.

If you must mount the receiver on the chassis, mount the receiver on its side with the crystal and antenna as far away from the chassis as possible to reduce the chances of radio interference.

Mount the antenna as close to the receiver as possible. Follow the receiver instructions for recommended antenna routing and mounting.

STEP 4

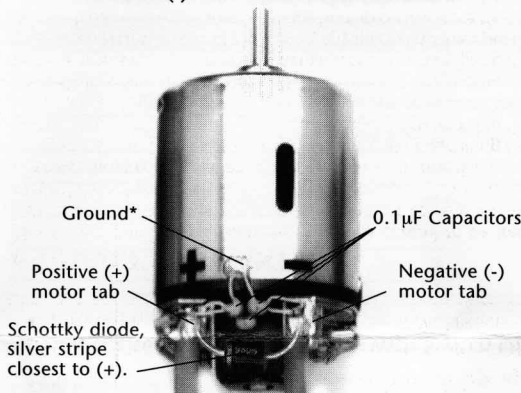
HOOK-UP INSTRUCTIONS

Refer to photos on front page

1. INSTALLING MOTOR CAPACITORS Motors generate radio noise that can cause radio problems. **Capacitors must be used at all times on every motor to prevent damage to the ESC.**

Solder the included three 0.1 μ F, 50 V, non-polarized, ceramic capacitors between:

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



Extra 0.1 μ F capacitors are available in Novak kit #5620
Extra Schottky diodes are available in Novak kit #5640
*Stock motors do not have ground tabs, solder to the can of the motor.

2. INSTALLING THE SCHOTTKY DIODE Solder the included Schottky diode between **POSITIVE (+)** motor tab & **NEGATIVE (-)** motor tab. The diode is polarized and must be installed with the silver stripe (+) closest to the **POSITIVE** motor tab.

3. PLUGGING INTO THE RECEIVER Plug the ESC into CHANNEL 2 (or THROTTLE CHANNEL) of the receiver. Plug the servo into CHANNEL 1. Nothing should be plugged into the BATTERY CHANNEL.

4. BATTERY & MOTOR CONNECTIONS Solder the included extra piece of red wire from BATTERY POSITIVE (+) to MOTOR POSITIVE (+).

Splice the ESC red wire into the extra red wire and insulate the solder joint with heat shrink tubing.

Solder the ESC blue wire to MOTOR NEGATIVE (-).

Solder the ESC Black wire to BATTERY NEGATIVE (-).

TROUBLE-SHOOTING GUIDE

This section describes common ESC problems, causes, and solutions. If you are unable to solve the problem, call our Customer Service Department for assistance.

ESC Will Not Program Properly

- Too little throttle throw in transmitter.
- Make sure ESC is plugged into CH 2. Test CH 2 using a servo to make sure receiver is OK.
- See Transmitter Adjustments section.

Steering Servo Works but No Throttle Response

- If heat sinks are extremely hot, ESC is in thermal shut-down mode. Let ESC cool down before driving.
- If heat sinks are cool, check wiring and motor for problems. Make sure ESC is plugged into CH 2.
- Run Set-Up again.
- ESC may have internal damage†.

Receiver Glitches or Stutters During Acceleration

- Motor capacitors broken or not installed.
- Use a milder motor or smaller pinion gear.
- Receiver mounted too close to ESC, see Step 3.
- Bad connections, check wiring (or plugs).

Model Runs Slowly or Has Slow Acceleration

- Bad connections, check wiring (or plugs).
- Current Limiter set too low.
- If heat sinks are hot, ESC is in 1/2 speed thermal warning mode. Let ESC cool down before driving.
- Incorrect transmitter settings. Run Set-Up again.

Motor & Steering Servo are Dead

- Check wires, input plug, radio system, and battery.
- ESC may have internal damage†.

ESC Light Blinks 5 Times during Set-Up

- Set-Up sequence was interrupted, run Set-Up again.

ESC is Melted or Burnt/ESC Runs with Switch Off

- Internal damage†. † See SERVICE PROCEDURES.

PRODUCT WARRANTY

Novak Electronics, Inc. guarantees the speed control to be free from defects in materials or workmanship for a period of 90 days from the original date of purchase (verified by a sales receipt). This warranty does not cover incorrect installation, components worn by use, damage due to using more than 10 cells, not using heat sinks, short-circuiting the heat sinks, component damage from excessive force when applying the heat sinks, damage from excessive force to the Current Limiter knob, not properly installing three 0.1 μ F (50V) capacitors on the motor, damage from incorrect installation of an external receiver battery pack, damage from incorrect installation of a FET servo, any splices into the input harness or switch harness, component damage from excessive force to the "SET" button, tampering with the electronics, allowing water, moisture, or any foreign material on the ESC's PC board, incorrect installation of an alternate input plug, or allowing any exposed wire to short-circuit.

In no case shall our liability exceed product's original cost. We reserve the right to modify the provisions of this warranty without notice.

Because Novak Electronics, Inc. has no control over the installation and use of the ESC, no liability may be assumed nor will liability be accepted for any damage resulting from using this product. Every ESC is thoroughly tested and cycled before leaving our facility and is, therefore, considered operational. By the act of installing or operating this speed control, the user accepts all resulting liability.

STEP 5

TRANSMITTER ADJUSTMENTS

For proper ESC operation, the basic transmitter throttle adjustments are:

HIGH ATV, EPA—Controls the amount of throw from neutral to full throttle. **Set to middle setting.**

LOW ATV/EPA/ATL—Controls the amount of throw from neutral to full brakes. **Set to maximum setting.**

EXP or EXPO—Controls the linearity of the throttle channel. **Set to zero or middle setting.**

SUB TRIM—Usually used to center a servo. **Set to zero or middle setting.**

TH TRIM or COAST BRAKE—Controls coast brakes of the ESC. **Set it to middle setting.**

MECHANICAL ADJUSTMENT—Adjusts throw of throttle trigger. **Set the throw for 2/3 throttle, 1/3 brake.**

THROTTLE REVERSING SWITCH—Set in either position. Do not change the setting after ESC Set-Up.

See **ONE-TOUCH SET-UP NOTES** on front page

STEP 6

SPEED CONTROL SET-UP

Before beginning this step, the ESC should be plugged into the receiver, a charged battery pack should be connected to the ESC, and the transmitter adjusted.

Turn on the transmitter and then turn on the ESC.

1. With the transmitter throttle in the neutral position, press and hold the ESC "SET" button until the ESC light turns solid red.
2. Release the ESC "SET" button.
3. Pull full throttle on the transmitter and hold until the ESC light turns solid green. *NOTE: The motor will not run during Set-Up even if it is hooked up.*
4. Push full brakes on the transmitter and hold until the ESC light blinks green.
5. Let the transmitter throttle return to neutral and wait until the ESC light turns solid red.

The ESC is now set and ready to run. If the transmitter settings are changed, run the Set-Up sequence again.

If you have a problem during the Set-Up sequence, turn off the ESC switch and start again.

SERVICE PROCEDURES

Before sending in your ESC for service, review the instructions and Trouble-Shooting Guide. The ESC may appear to have failed when other problems exist in the system—such as a defective transmitter, receiver, servo, battery, motor, or incorrect adjustments/installation.

PLEASE NOTE: Speed controls that operate normally when received will be charged a minimum service fee and return shipping charges.

WHAT TO SEND Fill out all of the information requested on the enclosed **ESC SERVICE CARD** and return it with your ESC. Please do not send the instructions, box, or accessories with the ESC.

WARRANTY WORK Customer MUST CLAIM WARRANTY on the **ESC SERVICE CARD** and include a valid, dated, cash register receipt, or a previous service invoice with the ESC. If any warranty provisions have been voided there will be a service charge.

SERVICE COSTS Customer assumes responsibility for service costs (parts, labor, and shipping/handling charges). All ESCs are returned UPS/COD CASH ONLY. See ESC SERVICE CARD for other payment and shipping options.

ADDITIONAL NOTES:

- Hobby dealers and distributors are not authorized to replace ESCs thought to be defective.
- Do not cut the input harness, switch harness, or power wires of the ESC before sending it for service. A fee will be charged for cut wires which must be replaced for testing.
- If your hobby dealer sends your ESC in for service, be sure to submit a completed **ESC SERVICE CARD** to your dealer and make sure it is sent with the ESC.
- To provide our customers with the fastest service possible, it is not our policy to contact customers by phone or mail.
- Novak Electronics does not make any electronic components (transistors, etc.) available for sale.

SEND SPEED CONTROLS TO:

NOVAK ELECTRONICS, INC.
18910 Teller Avenue
Irvine, CA 92715

CUSTOMER SERVICE HOURS (PST)

Monday-Friday: 8:00am-4:00pm
(714) 833-8873 • FAX (714) 833-1631

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Printed in the U.S.A. 6/94 IM-1750-1

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