

RACING ELECTRONICS
NOVAK



OPERATING INSTRUCTIONS



The Elektra is an entry-level mid-frequency speed control created with the high-end racing technology that Novak Electronics is known for.

The Elektra features the original **One-Touch Set-Up™** for quick and easy set-up. With Novak's revolutionary **Polar Drive Technology™** and **Digital Anti-Glitch Circuitry™** the Elektra runs longer and smoother than conventional ESCs (Electronic Speed Controls). While **Radio Priority Circuitry™** maintains total steering control even after the main battery pack has discharged and can no longer move the vehicle.

The Elektra has a built-in Schottky diode and BEC (Battery Eliminator Circuit), to provide radio system power without an external receiver battery.

The Elektra also has **Thermal Overload Protection** and purple anodized Micro Fin™ heat sinks to ensure smooth and cool operation. The factory-installed JST/Tamiya style battery connectors and bullet motor connectors make for quick and easy installation of the speed control into your car or truck.

ELEKTRA

Input Voltage	6 cells (1.2 volts DC/cell)
Case Width	1.75 inches [44.45 mm]
Case Depth	1.36 inches [34.59 mm]
Case Height	0.73 inch [18.42 mm]
Weight (w/o heat sinks)	1.71 ounces [48.48 g]
On-Resistance @ Transistors	0.010 Ω (25°C junction temp.)
Rated Current	120 amps
Braking Current	40 amps
BEC Rating	5.0 volts DC / 0.5 amps
Motor Limit	20 turns
Wire Size (Battery/Motor)	16 gauge
Wire Length (Battery/Motor)	6 inches [152 mm]
Signal Harness Length	6 inches [152 mm]
PWM Drive Frequency	500 hertz (nominal)

SPECIFICATIONS

#1930



All Novak ESCs are guaranteed to be free from defects in materials and workmanship for a period of 120 days from the original date of purchase. Complete warranty details inside.

ELEKTRA ACCESSORIES

MOTOR CAPACITORS

To prevent radio interference problems, you must have three 0.1µF capacitors properly installed on every motor. Included with the Elektra speed control are three 0.1µF (50V) capacitors (*enough for one motor*). Additional 0.1µF (50V) capacitors are available as Novak *Accessory Kit #5620* which contains 25 capacitors. Please refer to Step 4 on the back page for proper motor capacitor installation instructions.

HEAT SINKS

A replacement heat sink set is available for the Elektra speed control in Novak *Accessory Kit #5408*. These purple anodized Micro-Fin heat sinks provide the proper transistor cooling that is required to get the best performance from your speed control. The heat sinks keep the operating temperatures low to prevent overheating and thermal shut down, and result in more efficient speed control operation.

PRECAUTIONS

- **READ INSTRUCTIONS CAREFULLY BEFORE USING!**
- **WATER & ELECTRONICS DON'T MIX!** Do not operate model in or around water. Never allow water, moisture, or other foreign materials to get inside the ESC.
- **6 CELLS ONLY** Never use more or fewer than 6 sub-C cells (1.2 volt DC/cell) in the main battery pack.
- **MOTOR CAPACITORS REQUIRED** Three 0.1µF (50V) ceramic capacitors must be properly installed on every motor to prevent radio interference.
- **DO NOT REMOVE BATTERY OR MOTOR CONNECTORS** Internal damage can occur and will void the warranty.
- **DON'T LET TRANSISTOR TABS TOUCH** Never allow the two transistor tab banks or the heat sinks to touch each other or any exposed metal, as this will create a short circuit and damage the speed control.
- **DISCONNECT THE BATTERIES** Always disconnect the battery pack from the speed control when not in use.
- **TRANSMITTER ON FIRST** Always turn on the power of your transmitter first so that you will have control of the radio equipment when you turn on the speed control.
- **DON'T GET BURNT!** Transistor tabs can get hot, so be careful not to touch them until they cool.
- **INSULATE WIRES** Always insulate exposed wiring with heat shrink tubing to prevent short circuits.

RADIO INTERFERENCE

The high frequency switching operation of electronic speed controls can generate radio interference. Here are some common causes of radio interference problems:

- **CAPACITORS NOT INSTALLED ON MOTOR** Electric motors generate radio noise that can interfere with the receiver. To prevent radio problems, every motor must have three 0.1µF (50V) ceramic capacitors installed on it. Refer to Step 3 on back page for proper installation.
- **RECEIVER/ANTENNA INCORRECTLY MOUNTED** The receiver and antenna should be mounted as far from the motor, power wires, battery, and servo as possible, as these components all emit radio noise. On graphite or aluminum, place receiver on edge with the crystal and antenna as far above the chassis as possible. Mount the antenna close to receiver and trail any excess wire off the top of antenna. Do not cut or coil excess wire!
- **MOTOR BRUSHES WORN** As motor brushes continue to wear, excessive motor noise will be generated. To avoid radio interference, worn motor brushes should be replaced. The motor commutator may also need to be cleaned or trued and can be machined to help the motor run more efficiently.

STEP 1 HEAT SINK INSTALLATION

Two Micro Fin™ heat sinks have been included to provide proper cooling for the Elektra ESC. The speed control will operate cooler and run faster when the heat sinks are installed. **DO NOT** use the Elektra without the heat sinks, this voids the warranty and will cause the speed control to overheat and thermally shut down.

1. INSTALL THE LEFT HEAT SINK

Place the speed control on a flat surface and press one heat sink (*longer fins go down onto transistor tabs*) onto the left bank of 2 transistor tabs.

NOTE: Do not use excessive force when installing heat sinks because you can damage the transistors or other components on the PC board. Never use a vise or pliers to install the heat sinks.

2. INSTALL THE RIGHT HEAT SINK

Press the second heat sink (*again, long fins down*) onto the right bank of 3 transistors tabs.

The heat sinks should press onto transistor tabs with a snug fit. If heat sinks are installed upside-down or shifted off-center, they will be too loose and will not work properly.

3. DO NOT USE GLUE

Do not use glue or other types of adhesives to attach the heat sinks to the transistor tabs.

4. DO NOT SHORT CIRCUIT HEAT SINKS

The two separate banks of transistor tabs or heat sinks should never contact each other or other conductive objects (metal, graphite, etc.), or they will short circuit and damage the speed control.

STEP 2 MOUNTING INSTRUCTIONS

1. DETERMINE THE BEST ESC MOUNTING LOCATION

The speed control should be positioned away from the receiver and antenna as shown in set-up photo on back page. Choose a mounting position that will keep power wires away from the receiver and antenna. Choose a position that will provide maximum airflow through the heat sinks to allow for proper cooling.

2. INSTALL THE SPEED CONTROL

Use the included double-sided tape to mount ESC.

3. INSTALL THE ON/OFF SWITCH

Determine a convenient place to mount switch where it will be easy to get to. Mount switch using a piece of double-sided tape. If your car has a switch mount molded into the chassis, remove the two phillips head screws from the switch housing and reassemble switch into chassis using the 3/8" long screws included in the speed control accessory kit. Note direction of ON/OFF cover and reverse it if necessary.

4. INSTALL THE RECEIVER

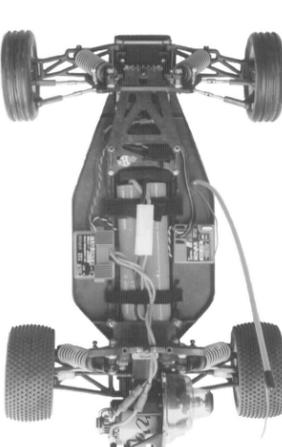
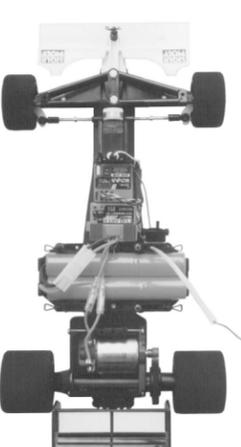
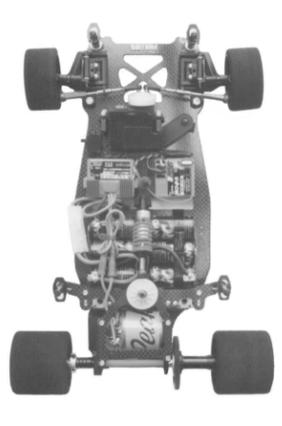
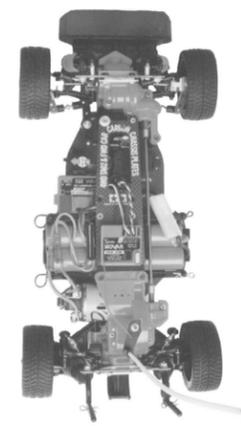
Mount the receiver as far from the speed control, motor, power wires, battery, and servo as possible. All these components emit radio noise when the throttle is being applied. If your car has a graphite or aluminum chassis, place the receiver on edge with the crystal and antenna as far above the chassis as possible. The receiver can also be mounted on the shock tower.

5. INSTALL THE ANTENNA

Mount the antenna as close to the receiver as possible. Trail any excess wire off the top of the antenna mast. Do not cut or coil excess wire.

Cutting or coiling excess wire will reduce radio range.

INSTALLATION EXAMPLES



STEP 3 HOOK-UP INSTRUCTIONS

Refer to set-up photo below

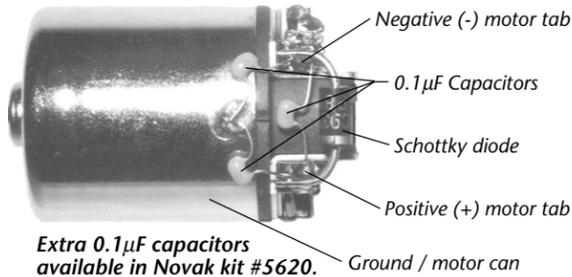
1. INSTALL MOTOR CAPACITORS

Electric motors generate radio noise that can interfere with your receiver and cause radio problems. Included in the accessory kit with the speed control are three 0.1µF (50V) non-polarized, ceramic capacitors. These capacitors must be installed on every motor to help reduce the noise generated by the motor and also to prevent possible damage to the speed control.

Solder 0.1µF (50V) capacitors between:

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

*If your motor does not have a ground tab, solder the capacitor leads to the can of the motor as shown below.



2. CONNECT SPEED CONTROL TO THE RECEIVER

Plug the speed control into the THROTTLE CHANNEL of the receiver.

3. CONNECT SPEED CONTROL TO THE BATTERY PACK

Plug the white JST connector from the speed control into the JST/Tamiya style connector on a fully charged 6 cell battery pack (1.2 volts DC/cell). The black wire is negative (-) and the red wire is positive (+).

4. CONNECT SPEED CONTROL TO THE MOTOR

Plug the bullet connector on the red wire (+) of the speed control to motor positive. Plug the other bullet connector, on the blue wire (-), to motor negative.

Removing or changing the battery or motor connectors may cause internal ESC damage and will void the warranty.

USE ONLY STOCK & MILD MODIFIED MOTORS (20 or more turns only!) with the Elektra speed control—Using hotter motors and lower gear ratios will cause the speed control to overheat.

TIP: Twisting the BLUE & RED motor wires one or two times around each other as they go to motor can help reduce any radio noise that may be emitted from the power wires. Refer to Set-Up photo.

5. OPTIONAL USE OF SCHOTTKY DIODE

The Elektra does not require an external Schottky diode. However, using one will increase the efficiency and reduce the operating temperature of the ESC.

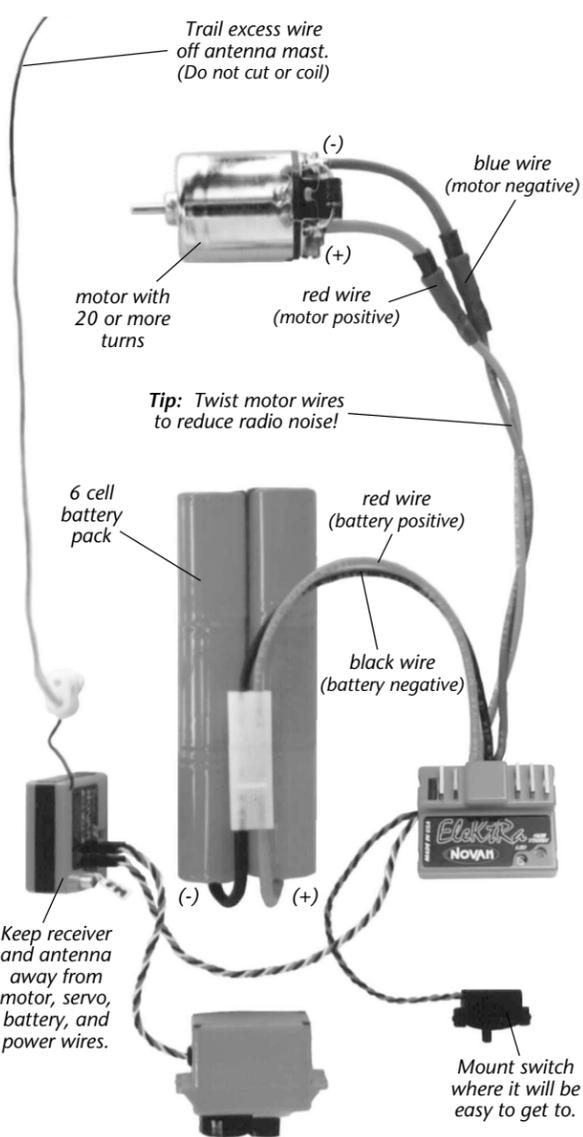
Solder the lead CLOSEST to the silver stripe on the body of the Schottky diode to the POSITIVE (+) motor tab.

Solder the lead OPPOSITE the silver stripe on the body of the Schottky to the NEGATIVE (-) motor tab.

Schottky diodes are available in Novak kit #5640.

If installed backwards, a Schottky diode will be destroyed. The body of a bad diode will normally crack open. Replace only with Schottky diodes that have a minimum rating of 35 volts / 8 amps.

ELEKTRA SET-UP



STEP 4 TRANSMITTER ADJUSTMENT

Proper transmitter adjustment is important for optimum performance from your speed control. The basic throttle channel adjustments for the transmitter are as follows:

1. Set **HIGH ATV** or **EPA** to **maximum** setting.
[Controls amount of throw from neutral to full throttle]
2. Set **LOW ATV**, **EPA**, or **ATL** to **maximum** setting.
[Controls amount of throw from neutral to full brakes]
[Reduce this after ESC adjustment to reduce amount of brakes]
3. Set **EXPONENTIAL** to **zero** setting.
[Controls the linearity of the throttle channel]
4. Set **THROTTLE CHANNEL TRIM** to **middle** setting.
[Adjusts the neutral position of speed control]
[Increase or decrease after ESC adjustment to adjust coast brakes—can be used to give braking in neutral trigger position]
5. Set **THROTTLE CHANNEL REVERSING SWITCH** to **either** position.
[Do not change switch position after programming]
6. Set **ELECTRONIC TRIGGER THROW ADJUSTMENT** to **70% throttle** and **30% brake** throw (or 7:3).
[Adjusts pistol-grip transmitter's throttle trigger throw]
7. Set **MECHANICAL TRIGGER THROW ADJUSTMENT** to position with **2/3 throttle** and **1/3 brake** throw.
[Adjusts pistol-grip transmitter's throttle trigger throw]

STEP 5 SPEED CONTROL ADJUSTMENT

Before beginning this step, the ESC should be connected to the receiver and a charged 6 cell battery pack, the motor disconnected, and the transmitter adjusted.

Adjustment of your Elektra speed control is required for proper operation. When the status LED is red, the speed control is in the neutral position (no throttle or brake). When the status LED is solid green, the ESC is at full throttle, and it will be flashing green at full brake position.

1. CONNECT THE BATTERY

Plug the speed control into a fully charged 6 cell nickel-cadmium or nickel-metal hydride Sub-C battery pack.

2. TURN ON THE TRANSMITTER

3. TURN ON THE SPEED CONTROL

Slide the ON/OFF switch to the ON position.

4. PRESS AND HOLD SPEED CONTROL'S SET BUTTON

With transmitter throttle at neutral, press and hold the ESC SET button until the status LED turns solid red.

5. RELEASE ESC SET BUTTON WHEN LED IS RED

6. PULL TRANSMITTER THROTTLE TO FULL-ON POSITION

Hold it there until the status LED turns solid green.

NOTE: The motor will not run during programming even if it is connected to the speed control.

7. PUSH TRANSMITTER THROTTLE TO FULL-BRAKE

Hold it there until the status LED blinks green.

8. RETURN TRANSMITTER THROTTLE TO NEUTRAL

Status LED will turn solid red, indicating that throttle is at neutral and proper programming has been completed.

9. CHECK OPERATION OF THE SPEED CONTROL

Connect the motor and check for proper operation. With no throttle or brake applied the status LED should be solid red and the motor should not be running. At full throttle the status LED should be solid green and the motor running full speed. At full brakes the status LED should be blinking green and the motor not running.

10. SET THE COAST BRAKE AT TRANSMITTER (optional)

Adjust the THROTTLE CHANNEL TRIM on the transmitter to get more or less coast brake. This is accomplished by slightly shifting the neutral position. After adjustment be sure that the status LED is still green at full throttle.

Speed control is programmed & ready to run!

If your transmitter settings are changed at any time after the speed control has been set-up, it will be necessary to complete the programming sequence once again.

If you experience any problems during programming, turn off the speed control and then repeat the entire programming process again.

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EleKtRa

TROUBLE-SHOOTING GUIDE

This section describes possible speed control problems, causes, and solutions.

Steering Channel Works But Motor Will Not Run

- Speed control has thermally shut down—Allow ESC to cool down—Use milder motor or smaller pinion gear.
- Check motor connections. Check motor and brushes.
- Make sure ESC is plugged into the throttle channel of receiver. Check throttle channel operation with a servo. Check wiring color sequence of receiver signal harness.
- Possible internal damage—Refer to Service Procedures.

Receiver Glitches/Throttle Stutters During Acceleration

- Motor capacitors broken or missing—Refer to Step 3.
- Receiver or antenna too close to speed control, power wires, battery, or motor—Refer to Step 2.
- Bad connections—Check wiring and connectors.
- Motor brushes worn—Replace brushes.
- Excessive current to motor—Use a milder motor or a smaller pinion gear.

Motor and Steering Servo Do Not Work

- Check wires, receiver signal harness wiring and color sequence, radio system, crystals, battery and motor connectors, and battery pack.
- Possible internal damage—Refer to Service Procedures.

Model Runs Slowly / Slow Acceleration

- Check motor and battery connectors—Replace if needed.
- Bad battery or motor—Check operation with another.
- Incorrect transmitter or speed control adjustment—Refer to Steps 4 and 5.

- Optional external Schottky diode (if used) installed backwards or damaged—Refer to Step 3.

Motor Runs Backwards

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

ESC Is Melted Or Burnt/ESC Runs With Switch Off

- Internal damage—Refer to Service Procedures.
- Application of reverse voltage—Refer to Service Procedures.

*For more help call our Customer Service Department.

SERVICE PROCEDURES

Before sending in your Elektra for service, review the Trouble-Shooting guide and the instructions. The ESC may appear to have failed when other problems exist.

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

WHAT TO SEND: Fill out all of the information requested on the enclosed ESC SERVICE CARD and return it with your speed control.

WARRANTY WORK: For warranty work, you MUST CLAIM WARRANTY on the ESC SERVICE CARD and include a valid cash register receipt with purchase date on it, or an invoice from previous service work. If warranty provisions have been voided there will be a service charge.

SERVICE COSTS: Customer is responsible for all service costs (parts, labor, and shipping/handling charges). See ESC SERVICE CARD for payment and shipping options.

ADDITIONAL NOTES:

- Hobby dealers or distributors are not authorized to replace speed controls thought to be defective.
- If a hobby dealer returns your speed control for service, submit a completed ESC SERVICE CARD to the dealer and make sure it is included with the speed control.
- Novak Electronics, Inc. does not make any electronic components (transistors, resistors, etc.) available for sale.
- To provide the most efficient service possible to our customers, it is not our policy to contact customers by phone or mail.

PRODUCT WARRANTY



Novak Electronics, Inc. guarantees the Elektra to be free from defects in materials and workmanship for a period of 120 days from original date of purchase (verified by dated, itemized sales receipt). Warranty does not cover incorrect installation, components worn by use, damage from using fewer or more than 6 cells (1.2 volts DC/cell) input voltage, not using heat sinks, short-circuiting heat sinks, cross-connection of battery/motor or reverse voltage application, damage from incorrect installation of FET servo or receiver battery pack, damage from excessive force while installing heat sinks or pushing One-Touch button, not installing three 0.1µF (50V) capacitors on motor, splices to switch or receiver signal harnesses, removing or changing the battery or motor connectors, damage from disassembling case, tampering with internal electronics, allowing water, moisture, or any other foreign material to enter ESC or get onto PC board, allowing exposed wiring to short-circuit, or any damage caused by a crash.

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

CUSTOMER SERVICE

CUSTOMER SERVICE HOURS (PST)

Monday-Thursday: 8:00am-5:00pm
Friday: 8:00am-4:00pm (closed every other Fri.)

(949) 833-8873 • FAX (949) 833-1631

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