1/10 Element 3900kV Brushless System

DURATRAX®

Element 3900kV Brushless System

The 1/10th Scale Element 3900kV brushless system is designed specifically for use in lightweight 2WD off-road applications, making it the ideal choice for buggies, trucks and short course vehicles. The 1/10th Element 3900kV system is installation-ready making it an easy upgrade from brushed or stock brushless systems. After installation into the vehicle a quick throttle setup is all that is required to get started! Many adjustable features allow the option of fine tuning the ESC to enhance the performance even more. The motor features a 4-pole design providing better efficiency and more torque which meet the demands of today's off-road vehicles.

Specifications

ESC

Voltage Input:	2–3S LiPo [7.4V–11.1V]
BEC Max:	3 Amps @ 2S input
Current Rating:	Up to 100A
Dimensions:	1.81 × 1.38 × 0.79" [46 × 35 × 20mm]
Weight:	2.0oz [56.5g]
Motor Wires:	13AWG 5.31" [135mm] Length, 4mm female bullet connectors
Battery Wires:	13AWG 4.72" [120mm] Length, Deans® Ultra Plug®
Receiver Lead:	11.02" [280mm] Length, Universal radio connector
Motor Limit:	On 2S: 4200kV Max On 3S: 2800kV Max

MOTOR

kV:	3900
Dimensions:	1.42 × 1.85" [36 × 47mm]
Weight:	6.54oz [185.4g]
Wires/Connectors:	13AWG 6.89" [175mm] Length, 4mm male bullet connectors
Voltage Input Max:	2S LiPo [7.4V]
Poles:	4
Shaft Dimensions:	0.125" [3.175mm] diameter × 0.71" [18mm] length

Warnings

Please read thoroughly before installation and operation.

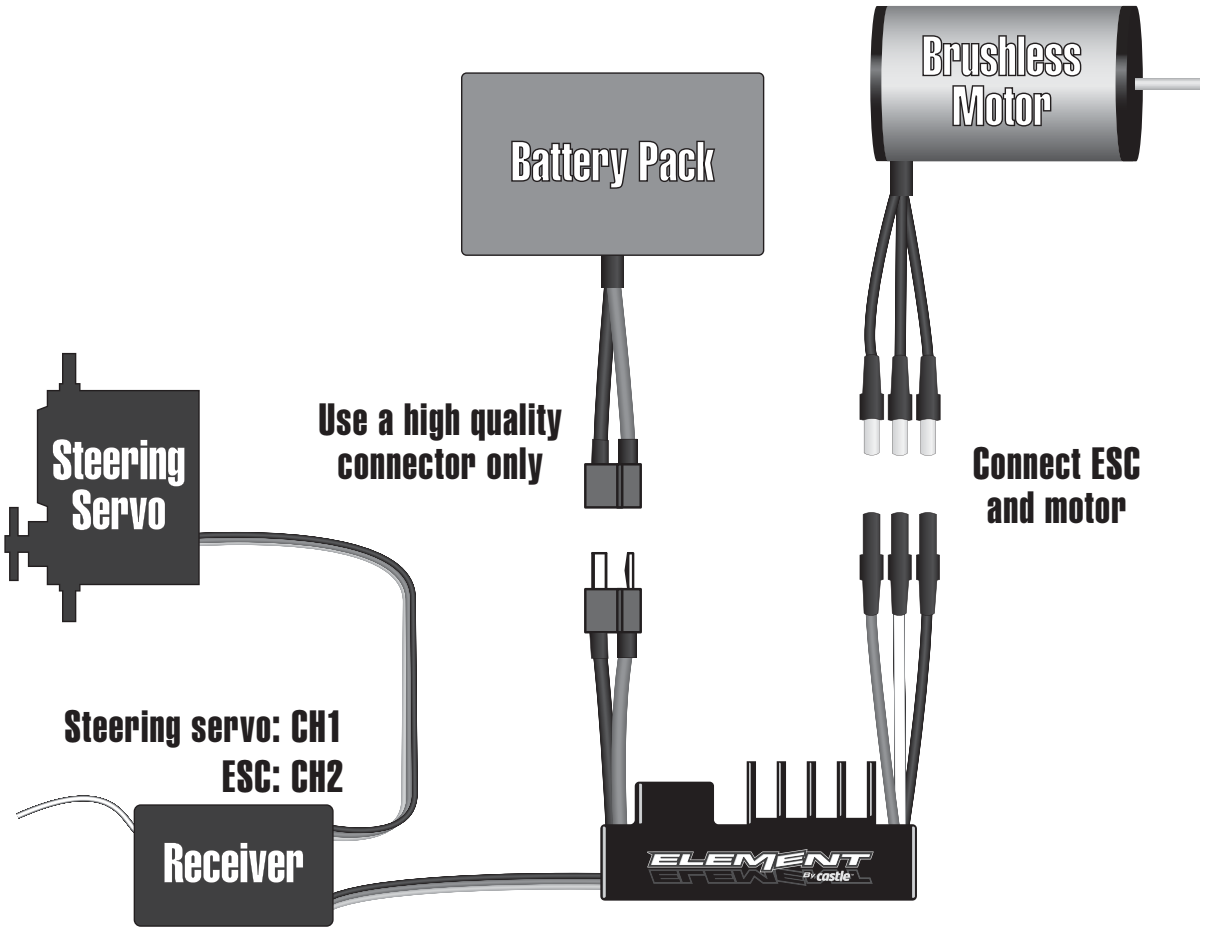
- Disconnect the battery from the ESC immediately if the ESC or battery becomes hot!! Allow the ESC or battery to cool down before reconnecting
- NEVER use more than the specified voltage on the ESC's input.
- ALWAYS mount the ESC in a position where free air can flow through the heat sink during operation.
- ALWAYS turn on the transmitter before connecting the battery to the ESC.
- ALWAYS disconnect the battery from the ESC when not in use.
- Make sure the input battery is fully charged before connecting to the ESC.
- DO NOT attempt to use with brushed motors.
- Use heat-shrink tubing to insulate any bare wires between the motor battery and ESC, and from the ESC to the motor, to prevent a short circuit.
- Allow the ESC to cool before touching.
- DO NOT run the car near water! Never allow water, moisture, or any foreign material onto the ESC's PC board.

- Do not allow metal/conductive materials to accidentally make contact across any or all motor/ battery posts.
- Never power up the ESC before plugging it into the RX and switching on the transmitter (TX).
- Keep out of reach of children.
- DuraTrax is not responsible for incidental damage or personal injury as a result of misuse of this product.

Optional Programming Equipment

The 1/10th Element 3900kV system is directly compatible with the Castle Creations Quick Field Programmer and Castle Link USB programming kit. The Castle Quick Field Programmer makes for quick parameter adjustments at home or at the track without having the need for a computer. The Castle Link USB interface can be used to more finely tune the Element ESC by opening up more tuning options and allowing for a full customization of settings. The USB interface also enables ESC software updates through the internet. Both the Quick Field Programmer and USB programming kit are sold separately at retailers throughout the U.S.A.

Connections



Quick Setup

It is recommended to remove your pinion gear prior to programming.

1. Mount the ESC and motor into the vehicle. Mount the ESC in a position where air can flow through the heat sink. This will allow the ESC to perform at maximum efficiency and minimize the chance of overheating.

2. Connect the three motor wires to the ESC wires.
3. Plug in the ESC to receiver cable to Channel 2 (throttle) of your receiver.
4. With your transmitter on and holding full throttle, plug the battery into the ESC.
   A. Once the battery is connected, four rings in a row will sound and the ESC will display a red LED.
   B. Hold full brake (trigger forward) until multiple tones sound and the yellow LED is displayed.
   C. Release the trigger to neutral. Shortly after, multiple tones will sound and all the LEDs will light up.
   D. A few seconds later, the ESC will arm and a double tone will sound. The system is ready.*

Note: *If using a Futaba transmitter®, you will need to reverse the throttle channel.*

** If the motor runs in reverse after setup, simply swap any two of the motor wires and try again. There is no polarity on the motor to ESC wires and does not matter which two wires are changed.*

Manual Setup

The Element ESC is extremely flexible when it comes to adjustable features and may be programmed to match any level of experience. The following section explains each programmable feature and how it will affect the drive ability of your vehicle. Follow these steps to change settings on your Element ESC without having to use a computer.

STEP 1: Turn the transmitter on.

STEP 2: While holding full throttle on the transmitter, plug the battery into the ESC. After a few seconds, four rings in a row will signal full throttle calibration. Continue to hold full throttle until a second group of four rings is heard. Then, relax the throttle to neutral. The ESC will beep twice, pause and beep two more times, signaling that the ESC has now entered the programming mode.

STEP 3: Programming is always presented in sequential order and always starts with the first setting (Reverse Lockout) within the first section (Reverse Type). The first beep(s) signifies which adjustable feature you are on and the second beep(s) signifies which setting is waiting for a “yes” or “no” answer.

As you go through each option, you will need to answer “yes” by holding full throttle, or answer “no”

by holding full brake until the ESC accepts your answer by beeping rapidly. Once an answer has been accepted, relax the throttle back to neutral for the next question. After a “no” answer is accepted, the ESC will then go to the next “setting” option in that section. After a “yes” answer is accepted, the ESC will skip to the first option in the next section.

BRAKE/REVERSE TYPE: Sets whether reverse is enabled or not and how it can be accessed.

Setting 1› Reverse Lockout (Default): Usually not allowed in racing. This will enable the reverse function after the ESC senses two seconds of neutral throttle.

Setting 2› Forward/Brake Only: Disables reverse. Commonly used for racing events.

Setting 3› Forward/Brake/Reverse: All functions are accessible once the ESC brakes to zero motor RPM (if the vehicle is moving).

BRAKE AMOUNT: Sets what percentage of available braking power is applied with full brake.

Setting 1› 25% Power: Allows only 25% of available braking power at full brake.

Setting 2› 50% Power (Default): Allows only 50% of available braking power at full brake.

Setting 3› 75% Power: Allows only 75% of available braking power at full brake.

Setting 4› 100% Power: Allows all available braking power at full brake.

REVERSE AMOUNT: Reverse must be enabled for this function to work. Sets the amount of power applied in the reverse direction.

Setting 1› 25% Power: Allows only 25% power in reverse.

Setting 2› 50% Power (Default): Allows only 50% power in reverse.

Setting 3› 75% Power: Allows only 75% power in reverse.

Setting 4› 100% Power: Allows 100% power in reverse.

PUNCH/TRACTION CONTROL: This smoothes high power starts and limits punch somewhat. For full power use a very low or disabled setting. For softer starts or for low traction surfaces, use a higher setting.

Setting 1› *High:* Very limited acceleration. Good for 2WD vehicles on hard dirt or for general bashing when you want to be gentle on the transmission.

Setting 2› *Medium:* Medium acceleration limiting. Good for 2WD vehicles on soft dirt.

Setting 3› *Low:* Light acceleration limiting.

Setting 4› *Lowest:* Very light acceleration limiting. Good for most situations.

Setting 5› *Disabled (Default):* Acceleration is only limited by battery ability.

DRAG BRAKE: Also known as “auto brake”. This transforms the speed control’s dead band into brakes with a pre-determined frequency and value. This means anytime the transmitter trigger is returned to the neutral position (dead band), the brakes will be applied at the specified percentage.

Setting 1› *Off (Default):* Vehicle will coast with almost no resistance from the motor at neutral.

Setting 2› *10%:* Low amount of braking effect from the motor at neutral throttle.

Setting 3› *20%:* More braking effect from the motor at neutral.

Setting 4› *30%:* Fairly high braking effect from the motor at neutral.

Setting 5› *40%:* High braking effect at neutral.

DEAD BAND: Adjusts the neutral width of the transmitter. Smaller values make the controller enter forward or brake/reverse with a smaller movement of the throttle trigger for finer control. If your ESC will not respond to Neutral throttle, make this setting larger.

Setting 1› *Large:* 0.1500ms

Setting 2› *Normal:* 0.1000ms (Default)

Setting 3› *Small:* 0.0750ms

Setting 4› *Very Small:* 0.0500ms

Setting 5› *Smallest:* 0.0250ms

CUTOFF VOLTAGE: Sets the voltage at which the ESC removes power to the motor in order to keep the battery at a safe minimum voltage (LiPo) or the radio system working reliably (NiCd/NiMH).

Setting 1› *None:* Does not cut off or limit the motor due to low voltage. DO NOT use with any Lithium Polymer batteries! *USE ONLY with NiCd/NiMH packs. With continued use, the radio system may eventually cease to deliver pulses to the servo and ESC and the vehicle will not be controllable.*

Setting 2› *Auto-LiPo (Default):* RECOMMENDED – This setting automatically detects the number of LiPo cells you have plugged in. It will automatically set the cut-off voltage to 3 volts per cell. The ESC will beep the number of cells in your LiPo pack between the initialization tones and the arming tones on the initial power up of the controller.

Setting 3› *5V:* Cuts off/limits the motor speed/ acceleration when the pack gets down to 5 volts. A good setting for racing or bashing in any vehicle using 8-12 cell NiMH or NiCd packs.

Setting 4› *6V:* Cuts off/limits acceleration when the pack gets down to 6 volts. *Use this setting for 2 cell (7.4V)LiPo packs. You will irreversibly damage your packs using a lower cutoff voltage!*

Setting 5› *9V:* Cuts off/limits acceleration when the pack gets down to 9 volts. *Use this setting for 3 cell (11.1V) LiPo packs. You will irreversibly damage your packs using a lower cutoff voltage!*

Setting 6› *12V:* Cuts off/limits acceleration when the pack gets down to 12 volts. *This is a setting for 4 cell (14.8V) LiPo packs. You will irreversibly damage your packs using a lower cutoff voltage! However, use of a 4S LiPo pack is not covered under warranty for the 1/10th scale Element ESC.*

MOTOR TIMING: Lowering the timing advance will reduce the current draw, increase run time, reduce motor/battery temperatures and may slightly reduce top speed and punch. Increasing the timing advance will do just the opposite.

Setting 1› *Lowest:* A maximum efficiency setting giving long runtimes and cooler motor temperatures. Very useful with high kV (low turn) motors to increase motor life and reduce motor/battery temperatures.

Setting 2› *Normal (Default):* The best mix of speed, punch and efficiency for all motors.

Setting 3› *Highest:* Increases amp draw, reduces runtimes, increases motor/battery temperatures and may increase top speed/ punch slightly.

Troubleshooting

If you're still having difficulties with your DuraTrax Element ESC after trying the suggestions offered here, please contact Hobby Services technical support at the e-mail or phone number in the next section.

PROBLEM

My ESC may or may not arm, but it will not calibrate to my transmitter.

1. Make sure you have both your throttle and brake endpoints (called EPA or ATV on your radio) on the throttle channel between 100% to 120%.
2. Make sure if you have a Futaba or Futaba made transmitter to have the throttle channel set to the reversed position.

PROBLEM

My ESC calibrates for the full throttle and full brake positions but won't calibrate to the neutral throttle position (yellow LED keeps flashing).

1. Try moving the throttle trim one way, then the other (usually towards the throttle side is best).

2. If your transmitter has a 50/50 or 70/30 setting for the throttle, set it for 50/50 and retry calibration.
3. If you have changed the dead band to a narrower band, you may want to try going back to the "normal" setting.

My vehicle has poor acceleration/punch for the first few feet or yards, and then it "kicks in".

PROBLEM

1. Make sure you're using high quality batteries and a battery connector capable of high amp flow (40-100 amps). This behavior is very typical of a battery pack that is having difficulty providing the power your vehicle/system requires for top performance.
2. If using NiCd/NiMH packs, use copper bars to connect cells rather than welded tabs. Copper bars have a much lower resistance.

My battery pack is plugged into the ESC and nothing is working – no steering or throttle.

PROBLEM

1. Make sure the ESC's receiver plug is plugged into Channel 2 on the receiver and that it's plugged in correctly.
2. Double check your solder connections on the battery plug and make sure the battery is showing good voltage.

Overheated motor or hot power plugs.

PROBLEM

1. The motor is geared too high. Change to a lower gear setup.

2. Check for binding in the vehicle's drive train and that nothing is interfering with the drive-train.
3. Check the motor for shorts, faulty motor connections and replace if necessary.

PROBLEM **Motor runs properly, then motor goes dead.**

1. The built-in thermal protection may be automatically shutting down power to the ESC due to overheating conditions.
2. Check for binding drive train, bad motor or incorrect gear ratio for track conditions. Check gear mesh, replace motor or change gear ratio. Let the ESC cool down and operation can be reattempted.

PROBLEM **Motor and Rx do not work.**

Make sure the motor battery is fully charged and that good contact is being made between the motor battery and ESC and from the ESC to the receiver. Try powering the receiver directly from a separate Rx battery…if the receiver now works, the problem may be the ESC and require servicing.

Notes

Service Procedures

ESCs that operate normally when received by Hobby Services will be charged a minimum service fee and return shipping charges. Before sending your ESC in for service, it is important that you review the "Troubleshooting Guide" on this instruction sheet. The ESC may appear to have failed when other problems exist in the system – such as a defective transmitter, receiver or servo, or incorrect adjustments/installation.

- Hobby dealers are not authorized to replace ESCs thought to be defective.
- Do not cut the input wires of the ESC before sending it for service. A fee will be charged for cut wires which must be replaced for testing.

180-Day Limited Warranty - USA & Canada Only

DuraTrax warrants this product to be free from defects in materials and workmanship for a period of 180 days from the date of purchase. During that period, we will repair or replace, at our option, any product that does not meet these standards. You will be required to provide proof of purchase date (receipt or invoice). If, during the warranty period, your ESC shows defects caused by abuse, misuse or accident, it will be repaired or replaced at our option, at a service charge not greater than 50% of the current retail list price. Be sure to include

your daytime telephone number in case we need to contact you about your repair. This warranty does not cover components worn by use, application or reverse voltage, cross connections, poor installation, subjection of components to foreign materials, any alterations to wires or tampering. In no case shall our liability exceed the original cost of the product.

Your warranty is voided if:

- You apply reverse voltage to the ESC by connecting the motor battery backwards.
- You allow any wires to become frayed which could cause a short.
- You use more than the rated number of cells in the motor battery.
- You tamper with any of the electronic components.
- You allow water, moisture or any other foreign material onto the PC board.

Under no circumstances will the purchaser be entitled to consequential or incidental damages. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. **If you attempt to disassemble or repair this unit yourself it may void the warranty.**

For service to your Element ESC or motor, either in or out of warranty, send it post paid and insured to:

Hobby Services (217) 398-0007
3002 N. Apollo Dr. Suite 1
Champaign, IL 61822

hobbyservices@hobbico.com
www.duratrax.com

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