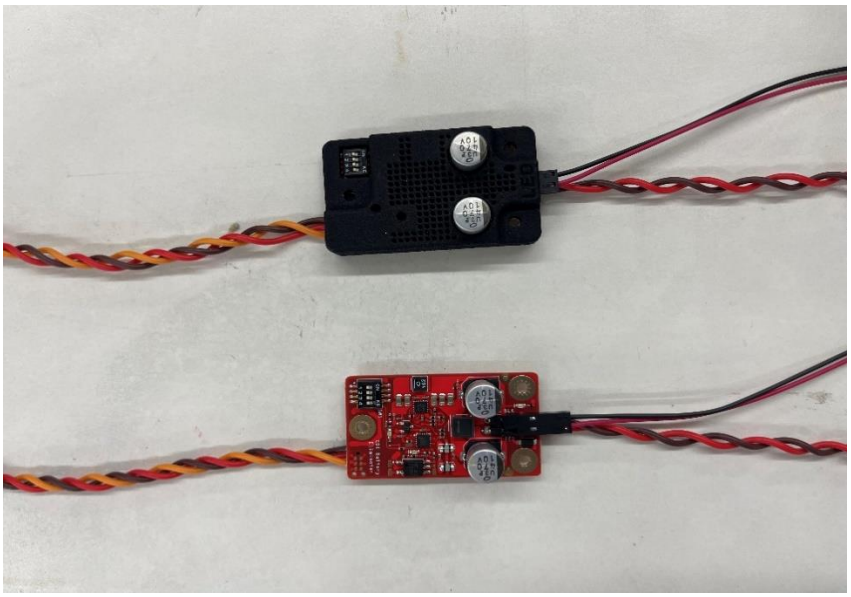
Gator RC

(CDI-BEC) CDI Battery Eliminator Circuit Manual



Features

1. Eliminates separate battery for Ignition modules.
2. Compatible with any receiver battery technology. (NiCad, NiMH, A123, LiPo, Li-Ion) Voltage input range (4.2v-16.0v)
3. Eliminates mechanical on/off switch for ignition modules. The ignition can be turned on/off with a transmitter channel.
4. Compatible with most CDI Ignition modules. Voltage output selectable (5.0v-8.0v).
5. Eight (8) voltage set ranges (5.0v, 5.4v, 5.8v, 6.3v, 6.7v, 7.1v, 7.8v, 8.0v).
6. State-of-the-art Filter section.
    a. Advanced 2nd order Common Mode CLC Filter with Feedthrough Capacitors.
    b. Low Pass/Low ESR capacitors Filter. Allow peak pulse current for the CDI module.
    c. Optical Isolation from Receiver. Prevent any CDI noise from returning to the receiver.
    d. Cross Talk elimination with twisted power Input and Output leads.
    e. 4-layer Circuit Board with solid ground planes for better noise suppression.
7. Auto Shut down on low receiver battery to prevent depleting receiver battery. (<4.10v for 10 seconds) Dead-stick is better than loss of control. (Selectable on/off)
8. Microprocessor signal processing of the receiver channel allows precise control of turn on and off.
9. Constant current LED driver output. LED brightness doesn't change with Voltage output changes. 15mA Allows any LED to be used.
10. In-field replaceable 5MM LED. Green LED Standard.
11. Current state-of-the-art power supply control circuitry allows a wide input voltage range and wide voltage output range. It doesn't require a receiver battery greater than the output voltage selected.
12. Heavy Duty 22Awg Input and Output lead allows low voltage drop at higher currents.
13. High-reliability SMD manufacturing allows for reduced weight and size.
14. Designed and manufactured in the USA, from foreign and domestic parts.

Thank you for your purchase of the Gator RC CDI Battery Eliminator. This innovative product eliminates the need for an additional ignition battery and a mechanical On/Off ignition switch in your model aircraft. It provides several advantages, including improved flight performance through weight reduction, consistent voltage supply, and reliable, current delivery to the CDI ignition module during flight. The CDI-BEC also features an On/Off "kill switch" function that enhances safety by allowing you to control the engine's ignition power throughout the entire operation of the model aircraft. Additionally, the CDI-BEC provides for a receiver voltage fail-safe cutoff. This function will turn off the CDI Module power if the receiver voltage goes too low for an extended time. A secondary fail-safe can be set up using “failsafe" capabilities found in most radio control systems, it can be configured to automatically cut power to the ignition module in the event of radio-related issues.

Installation of the CDI-BEC is straightforward: it plugs into a spare receiver auxiliary channel, supplying power to the CDI ignition module while effectively isolating the receiver and servos from potential high-frequency ignition noise that may exist along the wiring path to the CDI module. If you have a power bus expander product, you can also connect the CDI-BEC to it, providing an available auxiliary channel is available.

It's important to note that while the CDI-BEC effectively isolates the receiver from ignition noise in the wiring path to the CDI ignition module, it does not eliminate ignition noise radiated into the surrounding space by the CDI module itself or from the high-voltage wiring connections to the engine's spark plugs. This is a common characteristic of all ignition battery eliminators and optical kill switch-type products. Therefore, it remains crucial to follow the installation guidelines provided by the CDI ignition module and engine manufacturers to ensure adequate separation between the ignition system and all receiver components, servos, batteries, and wiring. Proper grounding of the shielding for the high-voltage connections to the engine's spark plugs should also be confirmed, following the manufacturer's instructions.

To maximize the effectiveness of the CDI Battery Eliminator, the power connection from the CDI-BEC to the CDI module is intentionally kept short. The lead to the receiver, on the other hand, is longer, allowing for adequate physical separation from the receiver. If an extension is necessary, it's advisable to extend the receiver side lead rather than the ignition side. This approach minimizes the antenna effect common with all electronic wiring, reducing the pickup of radiated ignition noise and limiting re-radiated ignition noise in the wiring between the CDI module and the CDI Battery Eliminator's output power side.

From the perspective of the radio receiver, the CDI-BEC behaves much like a high-torque servo. It comes pre-set to switch CDI power ON at approximately the midpoint(1600us) and a higher "travel" setting for the auxiliary channel it's connected to, with power being switched OFF below that same midpoint setting(1400us). Adjust the travel direction on the transmitter's auxiliary channel configuration to ensure that the ON and OFF settings align logically with the movement of the lever or switch for your preference. Configure the auxiliary channel ATV (travel endpoints) to 100% or more in both directions, with the sub-trim set to zero.

It is highly recommended to establish a failsafe condition for the CDI Battery Eliminator's auxiliary channel so that, in the event of radio communication loss, the CDI-BEC can automatically execute its "Kill Switch" function to stop the engine. Testing this setup during radio configuration is essential. Conduct a range check on your radio with the completed installation before a flight, verifying that it meets the

radio manufacturer's standard, all while securely holding and observing the engine/CDI on the ground with the assistance of a helper.

The amount of current drawn from the receiver flight pack battery depends on factors such as the CDI ignition module brand/model, the number of engine cylinders, and the engine's RPM. As a general guideline, plan for a conservative estimate of 100 to 120 mAh per spark plug/cylinder for a 10-minute flight. This estimation may vary depending on the CDI module design and your flying style, with higher average RPMs leading to greater battery capacity usage. Regularly monitor the battery capacity to determine the average usage of the combined load of servos and the ignition module during typical flights, and conduct pre-flight checks to ensure the battery has sufficient capacity to complete the flight with a reserve.

Refer to (Figure 1) for an illustration of the CDI-BEC connected to a receiver's auxiliary channel. The Gator RC CDI-BEC offers flexibility in supply voltage and battery configurations. You can use dual redundant regulators and batteries to ensure continued operation of the entire flight pack and ignition module in case of a single battery, wiring, or regulator failure. Alternatively, you may power the receiver and servos with one or more unregulated NiCad, NiMh, A123, LiPo, or Li-Ion battery packs. Unregulated NiCad or NiMh packs of up to 10 cells are suitable, and you can use up to a 4-cell A123 or 3-cell LiPo or Li-Ion unregulated battery packs to power the CDI-BEC provided that the rest of the flight pack (receivers and servos) can tolerate the higher voltages. The CDI-BEC will manage the correct voltage delivery to the CDI module through its Dip-Switch selectable voltage output feature.

The voltage output from the CDI-BEC is Dip-Switch configurable (Figure 2) to meet the voltage rating requirements of popular CDI modules. It's important to note that the voltage output level of the CDI-BEC can exceed the voltage level provided by the receiver's power bus. If this is the case, the current from the receiver will be more than the CDI Modules draw to get the increased voltage output needed. These modules have been tested with 4.0v receiver inputs with 8.0v outputs, with multi-CDI modules connected, and continuous operation is assured.

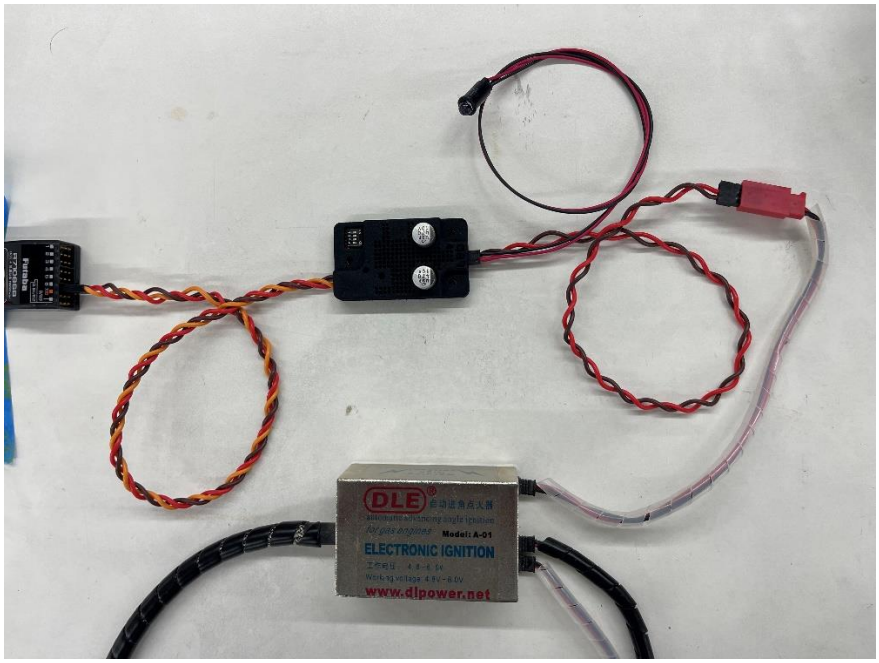
Additional Mounting Guidelines

When installing the CDI-BEC, exercise the same level of caution required for mounting other airborne electronic components exposed to engine vibrations, such as the model's receiver. The CDI-BEC also has three Servo size screw holes for mounting. Placing a ¼" or thicker foam pad under the unit will help isolate vibration when using this method. Two alternative methods are to use adhesive-backed Velcro® on the underside of the circuit board or use a thin Velcro® strap wrapped around the midsection and place a foam pad under the unit. Ensure the strap is snug to prevent the unit from moving. Avoid completely enclosing the CDI-BEC in foam or padding. The holes in the case need access to cooling air.

Warranty and Limitation of Liability

A 1-year limited warranty backs the Gator RC CDI-BEC. In the event of a malfunction caused by a product defect or failure, The Gator RC will repair or replace it within the warranty period. The liability of the Gator RC is strictly confined to covering the replacement cost of the CDI-BEC if it is deemed defective. The Gator RC does not assume any other responsibilities or liabilities related to the product's use or misuse, neglect, crash damage, or the careless or reckless operation of the model aircraft in which it is installed.

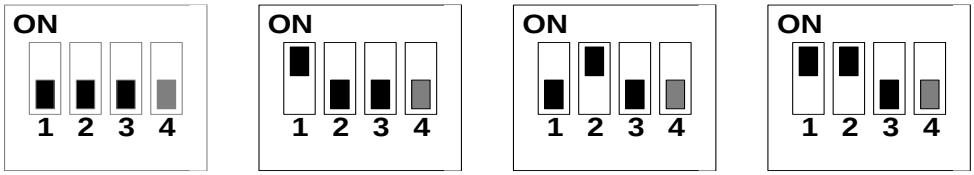
Figure #1



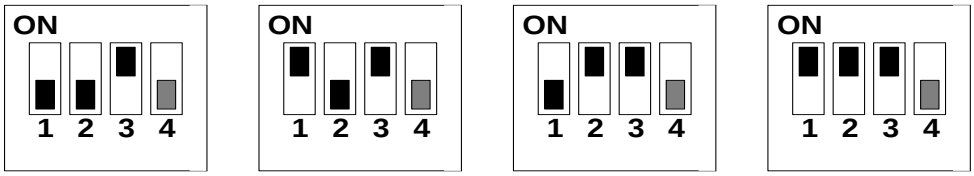
The three-wire connector side (Left Side above) is the receiver input connection. The two-wire connector side (Right Side Above) is the output to the CDI. This side also has the LED connector and LED that can be replaced in the field.

Figure #2 Switch Setup

Switches # 1, 2 & 3



5.0 V Output | 5.4 V Output | 5.8 V Output | 6.3 V Output



6.7 V Output | 7.1 V Output | 7.6 V Output | 8.0 V Output

Switch # 4

Low Voltage Shutdown Enabled

Low Voltage Shutdown Disabled