



# Jabiru Electric Upgrade Kits

## *Installation Guide*

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# 1. Included Items

## Alternator Upgrade



- 1 x 45 amp alternator
- 1 x 2-pin alternator plug
- 1 x Alternator bracket
- 1 x Alternator drive pulley
- 1 x Fan V-belt
- 1 x Nuts & bolts package
  - 4 x SHCS UNC #10-24 x 3/4"
  - 4 x Flat washer M5
  - 1 x SHCS M6 x 100
  - 1 x Flat washer M6
  - 1 x Nyloc nut M6
  - 1 x Coach Bolt M8 x 60
  - 1 x Alternator spacer
  - 1 x Flat washer M8
  - 1 x Nyloc nut M8
  - 1 x Hex head bolt M10 x 55
  - 2 x Flat washer M10
  - 1 x Nyloc nut M10

## E-Ignition Upgrade



- 1 x Hall sensor with mounting plate
- 1 x High energy ignition coil
- 1 x Wiring harness & module plug
- 1 x Ignition module
- 1 x Ignition coil lead
- 1 x Heat sink compound (approx. 5 mL)

## 2. Tools & Resources

### Required

- 5/16" spanner
- 7/16" spanner
- 7/16" socket wrench
- 3/16" allen key
- 5/32" allen key
- 5mm allen key
- 8mm allen key
- 13mm spanner / socket wrench
- 17mm spanner

### Optional

- Torque wrench
- Anaerobic adhesive
- Anaerobic primer
- Power drill
- 5 mm drill
- Aluminum sheet (2 - 3 mm thick, for coil mounting brackets and custom ignition module heat sink)

### 3. Installation Procedures

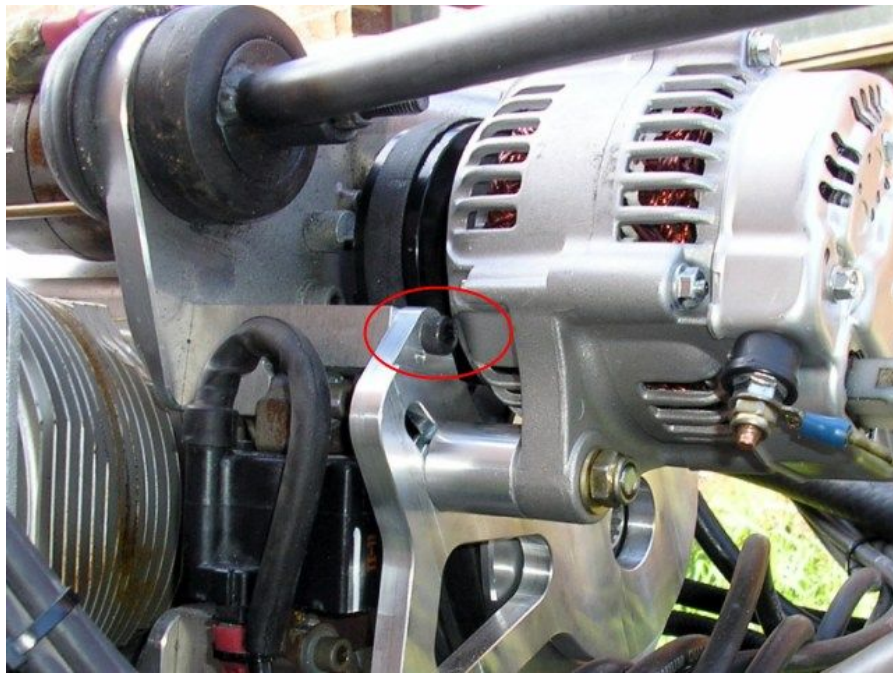
Prepare the work area and remove engine cowl and covers. The engine can be removed from the aircraft firewall using a hoist for ease of installation, although this is not essential. Refer to the aircraft manual for more information on removing your engine.

#### 3.1 Alternator Upgrade

1. Disconnect the battery. As always remove the negative terminal first. When reinstalling, always attached the negative terminal last.
2. Disconnect the standard Jabiru alternator wiring. None of the standard Jabiru alternator wires or voltage regulator are used for the Rotec installation.
3. Using a 5/16" spanner and 7/16" socket wrench, remove the 4 bolts holding the Jabiru alternator bracket. 3 of the 4 bolts are retained for later. Looking from the back of the engine, the upper left alternator bracket bolt is replaced with the provided M6 x 100 socket head cap screw. This is used to address a clearance issue with the alternator and mounting bracket.
4. Using an 5/32" allen key remove the 4 button head screws holding the magnet ring. Avoid stripping the hex head key of the screw as they will become difficult to remove.
5. Mount the drive pulley in place of the magnet ring. Fasten using the 4 3/16" UNC x 3/4" screws with washers provided. Tightening to 8 N.m (6 ft.lb). If you do not have a torque wrench, tighten relatively firmly using an allen key. Screws replace the original button heads.

**Note:** It is highly recommended that anaerobic primer then anaerobic adhesive is used on all threads to ensure retention.

6. Add the provided V-belt to the pulley
7. Introduce the Rotec alternator bracket making sure V-belt is around pulley (otherwise the belt cannot be added later). Be sure the M8 x 60mm coach bolt is included in the alternator adjustment slot before installation (see figure 3.1.1). As mentioned, used all original bolts to mount the bracket other than the the upper left alternator bracket bolt, looking from the back of the engine. Use the provided M6 x 100 mm socket head cap screw instead.



**Figure 3.1.1:** M6 x 100 mm socket head cap screw in position.

8. Add the alternator spacer to the coach bolt on the alternator bracket.

9. Introduce the alternator to the bracket. You will need to position the alternator on an angle to get the V-belt around both the alternator pulley and drive pulley. Once in position, add the M10 x 50 mm hex bolt. Add the appropriate washers and nuts and hand tighten the alternator into place. Position the alternator to appropriately tension the belt and tighten the alternator mounting bolts.
10. Plug the alternator plug into the alternator. A charging wire is required to be added connecting to the threaded terminal on the alternator (for the alternator wiring diagram, see *Figure 5.1*).



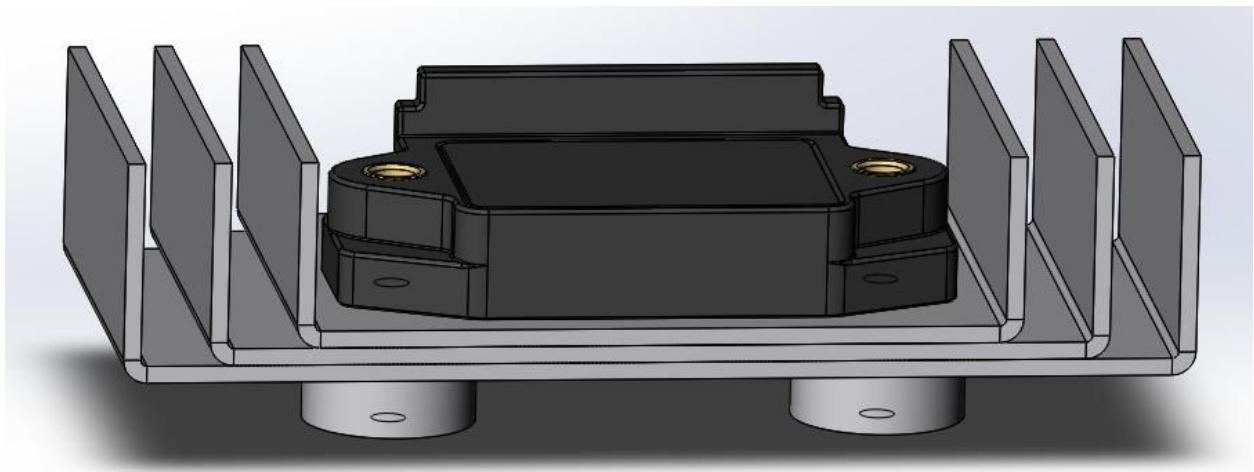
**Figure 3.1.2:** Completed alternator installation. E-ignition upgrade also featured (prototype engine final products differ in appearance).

## 3.2 E-Ignition Upgrade

1. Disconnect the battery, if you have not already done so.
2. Using a 3/16" allen key remove the magneto coil on the top side of the engine. Disconnect the coil lead attached to center of the distributor. The second magneto is retained.
3. The alternator bracket will need to be removed if you have included the Alternator Conversion Kit with your installation.
4. Install the Hall Sensor in place of the old magneto coil. Use the original screws.
5. Ignition Module:
  - a. Find a location to install the ignition module on your firewall or engine frame.
  - b. Source a heat sink with at least 64 cm<sup>2</sup> (10 in<sup>2</sup>) single side surface area (aluminium). The ignition module can overheat and subsequently fail when adequate cooling is not provided. Layers of sheet aluminum can be used (2 - 3 mm thick, for reference, see **Figure 3.2.1**).

**Note:** The ignition module must use a conductive source other than itself as a heat sink. For most installations, mounting the ignition modules directly to the firewall provides sufficient cooling. However, others have firewalls that experience excessive heat soak from the engine, potentially causing the module to overheat.

- c. Prepare the module/heat sink mounting surface by ensuring two 5 mm (3/16") holes are drilled 54 mm (2.125") apart. Ensure surface is free of dirt and grease. You can clean both surfaces of the heatsink and the ignition module plate with isopropyl alcohol.
- d. Using heatsink compound provided, apply a coating over the metal base of the ignition module.
- e. Mount the ignition module in position as desired (2 x 5 mm or 3/16" screws at 8 - 12 lbs/inch). The module must be located in a position where it is able to accept the wiring harness plug provided.
- f. Ensure the ignition module is earthed by the heat sink or a wire.
- g. The heat sink should have ambient air cycling over it during flight. If your installation allows it, we recommend that you route an air hose over your heat sink.



**Figure 3.2.1:** An example heatsink made from aluminium sheet.



6. Mount the ignition coil to the firewall or engine frame as desired. A simple bracket can be fabricated from aluminium sheet or angle bar.

7. Wiring Harness:

a. Plug the wiring harness to the ignition module

b. Plug the wiring harness 3 pin connection to the installed Hall Sensor. The connection is orientation sensitive, so ensure the colours of the wire match correctly (for wire numbers, refer to *Figure 5.1*). Orientation of the plug can also be determined by chamfers on one side of the plug. If the orientation is incorrect the hall sensor cannot be damaged, only the system will not create spark.

c. Connect the wiring harness positive (**red**) and negative (**black**) wires to the ignition coils positive and negative terminals. Later kits use a orientation specific plug to connect the coil.

d. Connect the short **black** terminal to an earth

e. Wire 7 is the tachometer output

8. Connect the ignition coil lead from the ignition coil to the centre distributor plug (for a full schematic of the wiring system, refer to *Figure 5.1*).

9. Ignition Switch: On a typical Jabiru there are two separate ignition switches used to earth the “P” leads of the two magneto coils. As standard, the magnetos are live when the contacts are open, and are off when closed when the “P” leads are earthed.

a. Use one of these switches to serve as the electronic ignition

switch, but the switch must be 12 volts positive when the contacts are closed.

- b. The switch has to be rotated 180 degrees and the wires changed from switching ground to switching 12 volt positive.
10. Tachometer (optional):
- a. The tachometer pulse signal is provided wire 7 of the ignition module (see *Figure 5.1*). Pulses per revolution is as follows:
    - Jabiru 2200 – 2 pulses per revolution
    - Jabiru 3300 – 3 pulses per revolution
    - Jabiru 5100 – 4 pulses per revolution
11. Starting:
- a. While the engine is cranking, engage the ignition module.

**Note:** The engine may have trouble starting if the ignition is engaged before the engine starts cranking. The spark is so hot that it tends to kick back the engine.

## 4. FAQs

### 4.1. Alternator Upgrade

**1. What is the added weight of using these items on my engine?**

The Alternator Conversion Kit adds approximately 2.2 kg (5 lb).

**2. What is the added length to the engine?**

The upgraded alternator adds no length to the engine. It meets to approximately the same engine length as the standard Bing Carburetor found on the Jabiru engine.

**3. What if the alternator belt fails? What is the likelihood of this happening?**

The alternator belt is to be inspected every 100 hours. In the unlikely event of the alternator belt failing the engine would continue running using the battery power for approximately 45 minutes. This should give the pilot enough time for an emergency landing.

**4. How many amps can I expect to have after upgrade?**

Maximum output of 45 Amps.

**5. I have radio interference. What can I do to stop it?**

A shielded wire or decoupling capacity can be used to prevent any interference signal that may be picked up the aircraft's radio equipment. This will be only required on the charging wire (screw terminal, see *Figure 5.1*), as the length of the wire will be acting as an antenna.

## 4.2 E-Ignition Upgrade

### 1. What is the added weight of using these items on my engine?

The Electronic Ignition Conversion Kit additional weight is negligible, with the only additional item added to the installation being a coil.

### 2. Should I make adjustments to the spark plug?

There are no recommendations with regards to spark plug gap modification. Standard Jabiru spark plugs are used. While a greater voltage is required to jump a greater spark plug gap, the advantages in modification are perceived to be negligible.

### 3. What are the power requirements of the system?

The system draws approximately 1.8 amps at cruise.

### 4. What are the wire lengths of the system?

Wire harness:

- Ignition Module to Hall Sensor: 74 cm (including hall sensor)
- Ignition Module Plug to Ignition Coil Plug: 67 cm
- Ignition Coil Plug to Ignition Power Terminal: 67 cm

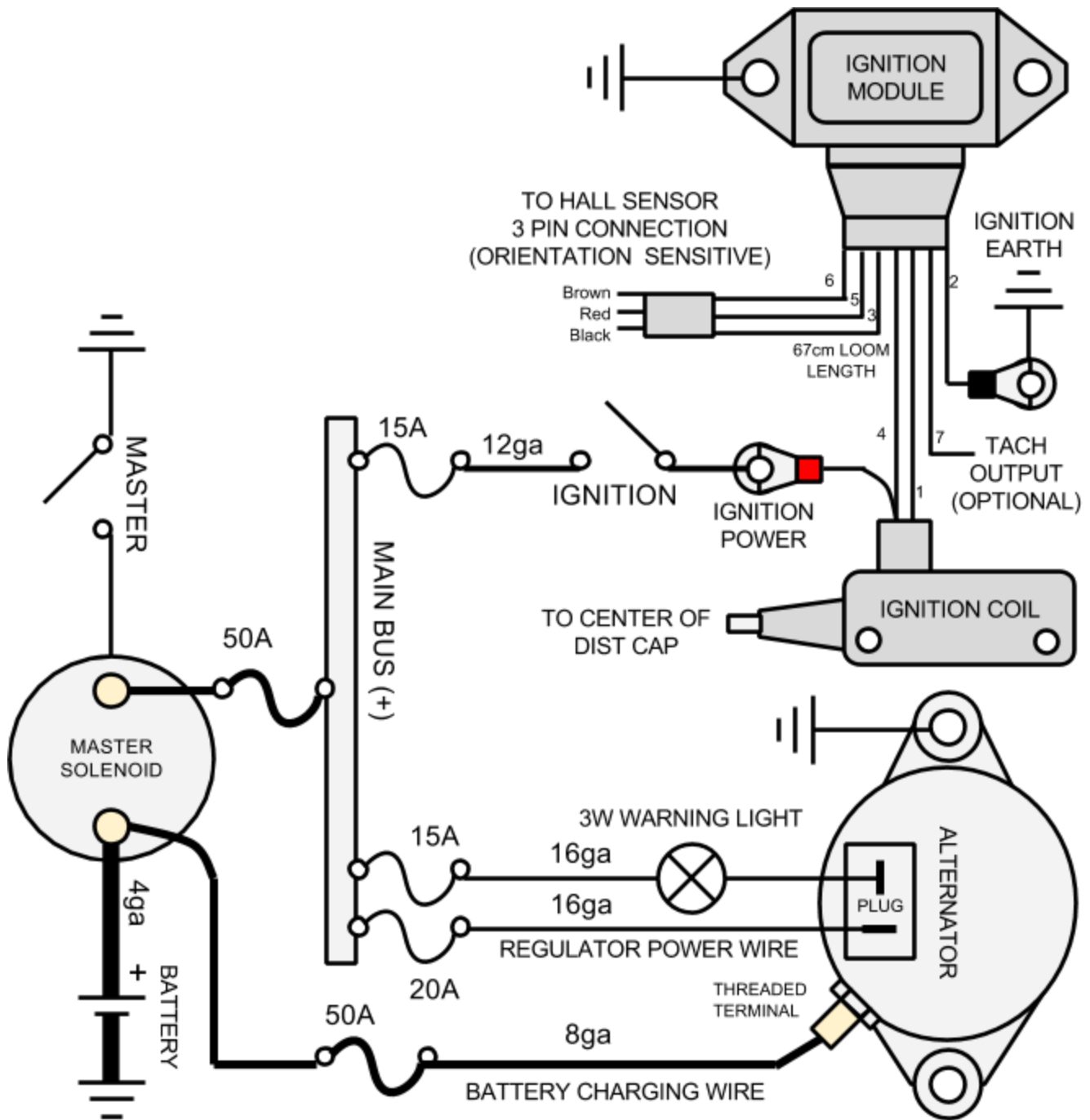
Distributor lead:

- Distributor Cap to Ignition Coil: 40 cm

### 5. What other products do you supply for my engine?

The [Rotec Liquid Cooled Heads](#) (LCH) & and [Rotec TBI Fuel System](#) (Throttle Body Injection) will further increase the reliability and performance of your engine.

## 5. Basic Wiring Diagram



**Figure 5.1:** Basic wiring diagram for most aircraft.