

RCEXL Ignition Systems

from

Apache Aviation

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WARNING

RCEXL ignition systems are designed for use in MODEL AIRCRAFT and should NEVER be used in a Man Carrying Vehicle

SPECIFICATION

BPMR & CM-6/Y82 Single Cylinder Ignition System

Supply voltage: 4.8v

Supply current @ 8000 rpm: 650mA

Output voltage: 12-16KV

Weight: less battery: 115g

Case: ABS - Nickel plated

Plug size: BPMR6A - 14mm - 3/4" hex

BPMR6F - 14mm - 5/8" hex

CM-6/Y82 - 10mm - 5/8" hex

Warranty: 1 year from date of purchase

SELECTING THE IGNITION BATTERY

4.8 VOLT PACKS

The Rcxel Ignition is rated for 4.8v to a max of 6v. A 4-cell 4.8v pack with a minimum of 800 mAh is fine (1200mA is better) and creates a hot spark. The Rcxel Ignition runs most efficiently on 4-cell packs. **We recommend that you always use a new 4.8v pack.**

6 VOLT PACKS

We have found that 5-cell packs at peak charge can be over 7 volts. Therefore, if you are going to use a 5-cell pack, **you must use a voltage regulator**. The RCEXL Ignition runs more efficiently on 4-cell packs and will draw more much current at 6v, as well as operating at a higher temperature with no performance advantage. You also have a higher chance of RF interference. We recommend the use of a 4-cell 4.8v pack. **Do not use an old pack to power your ignition!**

INSTALLATION

SPIRAL WRAPPING

Use the supplied spiral wrapping included with your ignition to protect the wires from heat and chafing. Wrap the braided spark plug lead, hall sensor leads and battery lead.

MOUNTING

Mount your ignition in the engine bay, if possible. Wrap the ignition in foam to reduce the effects of engine vibration, as you would do with your receiver. We do not use the mounting tabs on the ignition but recommend using rubber bands to secure it against the firewall. Do not install your ignition in the fuselage. **Do not use a metal throttle servo or steerable nose wheel pushrod**. Keep the ignition as far away from your receiver as possible and never use the same power source to run your ignition and receiver jointly.



CONNECTING THE BATTERY

The RCEXL Ignition utilizes Futaba plugs and comes with an additional pigtail to make up an ignition switch harness, if necessary. Be sure to follow the colour coding (Red+, Black-) when attaching your battery and on/off switch to the ignition power leads. **The system is not reverse polarity protected.** Wrap the battery with foam and mount it as far away from the receiver as possible, preferably on the engine bay.

HALL EFFECT SENSOR

Choose the sensor bracket that best suits your engine and determine the orientation of your magnet, if unknown. A quick way to determine the orientation is to connect the hall sensor to the ignition, **insert a resistor spark plug** and connect your battery. Quickly pass the sensor over the magnet without stopping over the magnet, to avoid damaging the sensor. If the plug doesn't fire, flip the magnet or sensor over and repeat.



MAGNET INSTALLATION

The magnet will shatter if struck or dropped onto a hard surface.

Do not place the magnet within 10mm of a credit card.

Drill a 3mm diameter hole 4mm deep in the prop driver. Insert the magnet flush with the prop driver face and secure with cyano or similar adhesive.

PRESS THE MAGNET INTO PLACE - DO NOT HAMMER IT DOWN - IT WILL SHATTER.

ASSEMBLING THE SENSOR BRACKET

Select the 30mm or 38mm bracket to fit the diameter of the front bearing housing. Fully insert the sensor into the sensor housing. Use the supplied wedge to hold the sensor in its housing. **Warning! The wedge is designed to be a one-way fit;** make sure you have the proper sensor orientation before inserting the wedge, as it will be **VERY** difficult to remove and may render the bracket unusable or even damage the sensor or the lead. If the RCEXL system is a replacement for another maker's faulty system (3W, etc), you may be able to use their existing sensor bracket.



If you are going to attempt to use your existing hall sensor, ensure the wire orientation, in your Futaba connector, is in accordance with this illustration.



TIMING

Timing will vary from engine to engine. Usually, 28°-30° before top dead centre (TDC) is the recommended maximum. The ignition reaches full advance at 4000 rpm. **More than 30° advance will cause knocking, excessive vibration and may result in permanent internal engine damage.**

Using the degree wheel printed sheet as a template, cut a backing half wheel from ply. Glue the 180 degree printed sheet onto the ply backing and drill a crankshaft clearance hole in the centre. Mount the degree wheel loosely onto the crankshaft.

Make a piano wire pointer and attach it to the head. Rotate the engine crankshaft so the piston is set at TDC. This can be ascertained by using a short wooden dowel to make contact with the piston top through the spark plug hole. Rotate the crankshaft back and forth to get TDC as close as possible. A dial indicator can also be used. After locating the TDC point of the crankshaft, move the degree wheel, so it reads 0 degrees and lock it down.

Turn the crankshaft clockwise (opposite to the engine rotation) until the wheel reads 28 degrees (or your required angle). Connect the battery to the ignition, ensuring that the spark plug is not in the cylinder, **but is in the plug cap.** **Warning! Avoid turning the engine over with the ignition energized without the spark plug being attached to the HT lead. Operating the ignition system without a spark plug attached could damage the hall sensor pickup.** The plug will fire just as the rear edge of the magnet clears the sensor. You can check that everything is connected correctly by rocking the crankshaft so that the magnet passes under the sensor and a spark is generated.

For Adjustable Magnet Rings

Turn magnet fixed ring anti-clockwise. When you see the plug firing, stop and lock down the ring. The correct ignition timing is now set (28°-30°). The plug will fire as the magnet passes slightly past the hall sensor. This is a normal condition.

For Fixed Hall Sensors

Try to use your existing hall sensor mounting holes. If this is a flywheel magneto conversion, you will need to find the hall sensor position at a 28 degree advance point (or your required advance angle) by using the degree wheel and drill and tap your own. Two M3 fixing screws are supplied and the holes on the hall sensor housing are oval to allow for some adjustment.



Degree wheel construction

Cut a sheet of ply or similar material to the semi circular shape of the Degree Wheel Printed Sheet and glue the sheet onto it. Drill a clearance hole to fit the prop driver thread.



Typical degree wheel and pointer arrangement

A bulldog clip has been used to temporarily attach a piano wire pointer to the cylinder fins. Make sure the pointer is firmly located and cannot move during the sensor timing setting procedure.

First time use of the Plug Cap over the Spark Plug.

The RCEXL spark plug cap fits very tightly because, as well as being the HT lead, it is the earth connection for the system. Install by engaging the cap on to the spark plug. Then push down firmly and **twist**. It should go down almost to the top of the cylinder. In some cases, it may prove difficult to remove the cap. To remove the cap, pull up and **twist**. It will then come off fairly easily. DO NOT use pliers on the cap and DO NOT pry on the cap with a screwdriver. You will destroy the cap and maybe pull the contact spring out of the silicone boot. It cannot be put back in without taking the cap apart and this will damage the locking tabs and void the warranty on the system.

3W SYSTEM REPLACEMENT—SPECIAL NOTES

When replacing a faulty 3W ignition system, the existing magnet(s) can be used. On the later 3W two magnet systems, the magnets have been fitted with reversed poles. That is, on magnet is north pole outwards and the other is south pole outward. The RCEXL hall sensor will only trigger on one of the polarities, therefore it is not necessary to remove one of the existing magnets. Either can be used as the trigger magnet depending on which way up you place the hall sensor in the bracket. After determining which is the more convenient of the two magnets to use, pass the hall sensor over the magnet and check for a spark. No spark means you must turn the sensor over to obtain the correct polarity.