

FAQs

1. If I choose the option of one mag/one EIS, the mag has a fix firing advance and the EIS has a variable firing advance: how can this set-up work properly?

Our electronic ignition always fires at the same time as the magneto or earlier. Magnetos are set to fire at fixed timing point (like 25 deg BTDC), period. So the combustion is already underway when the mag fires and hence has very little effect.

2. What is the typical duration of spark for the EIS? How is this a benefit?

The EIS holds the spark for twenty degrees duration of crank. A magneto has a spark-duration of approximately five degrees of crank. A CDI system has an even shorter spark-duration than a magneto. The longer spark keeps igniting the unburned fuel which is spinning like a tornado as it comes by the spark plug. As a result, this longer spark leads to better fuel efficiency and cleaner plugs.

3. What are some typical fuel consumption gains when an EIS is used?

Typically a 10-15% fuel reduction can be expected is when using one EIS. At higher altitudes, the fuel reduction improves even more, in some cases as much as 30%. Also, we have recorded gains of actual horsepower output on 4-cylinder Lycoming engines at low altitudes. At higher altitudes, the horsepower gain increases even more. (High altitude refers to cruising altitudes of 10,000 feet or more). There are several pilot reports that are being collected in the Testimonial section of the Electroair website with data showing substantial performance improvement.

4. What are the voltage requirements to start and run the EIS?

We have systems for either a 12V or 24V aircraft.

5. Where should the coils and controller mount?

The coils are designed to mount on the engine side of the fire wall. The controller is designed for the cabin side - cool side. The MAP sensor is designed for cabin side installation as well.

6. EXPERIMENTAL ONLY! Is a back-up battery required if I run two EIS units?

Yes, for dual electronic ignition, we require a dual battery system. Certified ignition systems are approved only as a single magneto replacement and do not require a back-up battery.

7. What spark plugs do you recommend? Do you recommend automotive spark plugs?

Certified Installations: Only aircraft plugs may be used. Electroair makes a line of spark plugs that are pre-gapped to the correct dimension and are approved for use with our systems.

Experimental Installations: You may use either the aircraft or automotive spark plugs. However, we recommend with aircraft engines to use aircraft plugs. Care and caution must be exercised when evaluating automotive spark plugs for experimental aircraft. For automotive plugs, verify that the plug's heat range is appropriate, and whether or not it will fit in the engine. Failure to do so could result in severe damage to the engine.

8. Can I re-use my aircraft spark plug harness with the EIS?

No, you can not use a copper wire, or solid core harness. You have to use a noise suppression (a.k.a. resistive) spark plug wire in order to prevent unwanted RF noise from damaging the controller. Electroair supplies the appropriate harness wire with attaching hardware to complete your installation.

9. How long will an EIS last? Is there an overhaul requirement?

We have some systems with over 3000 hours of flying time. Follow the Instructions for Continued Airworthiness for the required overhaul and replacement times for the various components.

10. How is the timing picked up by the controller?

We use a 60 minus 2 tooth trigger-wheel, with a single magnetic pickup. The trigger-wheel/magnetic pick-up provides a high resolution signal which feeds continuous RPM information to the controller. In a four-cylinder application, the Mag-Timing Housing (MTH) encloses the trigger-wheel/mag pick-up and replaces one of the magnetos. In a six-cylinder application, we use a crank-shaft trigger-wheel with the pick-up mounted on a bracket. Electroair is developing a six-cylinder MTH that will be available later in 2014.

11. Which spark plugs should the EIS be put on? All the top plugs, all the bottom plugs, or some top and some bottom?

It makes no difference which spark plugs the EIS is connected to. Approximately 80% of current users have installed the EIS on the bottom plugs because the hotter spark tends to keep lead from fouling the spark plugs and becoming a problem. (Bottom plugs have a higher tendency to fail because of lead fouling).

12. Does your EIS work on other aircraft engines like the Subaru?

Yes, we have sold many of our systems for use on the Subaru engines used on aircraft as well Volkswagen, Jabiru and others. Let us know what engine you're using and we'll let you know if our system has ever been installed on a similar engine. We also will let you know if there is anything out of the ordinary for installing an EIS.

13. Will the 'waste' spark damage my engine?

No, the coil fires a plug on the compression stroke and a plug on the exhaust stroke. This spark fired on the exhaust is called a 'waste' spark and has no effect at all on the engine.

14. How does your system compare with a CD Ignition (Capacitor Discharge or CDI)?

The Capacitor Discharge Ignition (or CDI) does not charge an ignition coil, rather it uses the 1:100 winding ratio of the coil as a transformer. Initially, the 12 volts of the electrical system is converted to 200-500 volts and stored in a capacitor. When the spark is required, the capacitor is discharged into the ignition coil instantly producing a spark with duration of only 0.1 to 0.3 milliseconds. For many applications this spark duration is not long enough to ensure that the air-fuel mixture ignites completely. <cont. next page>

A multiple coil ignition system, like the Electroair EIS solves this problem by using an ignition coil for every pair of companion cylinders. The time available to charge an ignition coil goes up. This allows the full benefit of an inductive charging method to be realized: the coil will apply enough voltage to the spark plug to jump the gap (regardless of cylinder pressure). The rest of the energy in the coil will then be dissipated in the plug as measured by the spark-duration. Depending on the cylinder pressure, the spark duration will be over 2.0 milliseconds. This spark-duration ensures that any air-fuel mixture will burn!

15. Is there an equivalent to the impulse delay on one or both mags?

During the start sequence of the engine, the EIS sets the ignition timing to 0 TDC and does not begin to fire until approximately 50 RPM. This allows the engine to overcome compression strokes and develop a smooth acceleration to a normal operating RPM. Once the engine RPM reaches ~250RPM, the ignition timing steps to seven degrees BTDC and then advances to engine ignition timing (20deg, 25deg, etc.) once the engine RPM reaches ~400RPM. The dynamic changing of the ignition timing during the start sequence happens in a blink of an eye, so to speak, and helps to insure an easy start everytime.

16. My engine has a dual magneto, how do I adapt my engine to use the EIS?

EXPERIMENTAL ONLY! We use a split ring collar on the crank shaft for the electronic ignition timing pick-up. There are some single magnetos that will adapt to the dual mag hole, or alternatively you can operate two electronic ignition systems. Call us and we'll review the details.

CERTIFIED AIRCRAFT: We have begun looking at engineering projects that will develop into replacement kits for certified aircraft using the Bendix Dual Magneto (D2000 & D3000 series). We will keep the website posted with progress reports as these projects develop. Unfortunately, our dual magneto solutions are limited to experimental aircraft at the moment.