

E-MAG Electronic Ignition: Complete Installation Buying Guide

Upgrade Your Experimental Engine — Here's Everything You Need

Replacing your aircraft magnetos with E-MAG electronic ignitions is one of the most impactful upgrades you can make to an experimental engine. Better starts, improved fuel efficiency, smoother cruise, and built-in self-powered redundancy — all in a package that installs exactly where your magnetos already sit. This guide walks you through every component you'll need for a complete installation.

Want Everything in One Box? Start Here.

The **Complete Ignition Kits (EMK series)** bundle the ignition module, plug wire harness, incidental kit, and spark plug adapters into a single order — no need to work through each step below. Just match your engine type, cylinder count, spark plug type, and whether you want a single or dual installation.

Part Number	Single / Dual	Engine	Spark Plug	Ignition Module
EMK00301	Single	4-Cylinder	BR8ES	EMA01402
EMK00801	Single	4-Cylinder	IKH27	EMA01402
EMK00401	Dual	4-Cylinder	BR8ES	EMA01402
EMK00901	Dual	4-Cylinder	IKH27	EMA01402
EMK01301	Single	6-Cylinder	BR8ES	EMB08005
EMK04901	Single	6-Cylinder	IKH27	EMB08205 (fixed timing)
EMK02201	Dual	6-Cylinder	BR8ES	EMB08005
EMK05001	Dual	6-Cylinder	IKH27	EMB08205 (fixed timing)

■ **Note:** Kits paired with the IKH27 (Denso iridium, long reach) plug include the EMB08205 ignition module, which features fixed timing. All other kits use variable timing modules.

If you prefer to select components individually — or need to source a replacement part — continue through the steps below.

Step 1: Choose Your Ignition Module

Start by selecting the E-MAG module that matches your engine. E-MAG ignitions are available for 4-cylinder and 6-cylinder engines in both Lycoming-style and Continental-style configurations. You'll also choose between **variable timing** (automatically adjusts advance based on RPM and manifold pressure) and **fixed timing** (fires at one pre-set angle — simpler operation, ideal for straightforward builds).

Engine Type	4-Cylinder	6-Cylinder	6-Cyl Fixed Timing
Lycoming-style	EMA01402	EMB08005	EMB08205
Continental-style	EMA01502	EMB09001	—

Single or Dual? You can replace one magneto at a time, but most builders opt for dual E-MAGs to get the full performance benefit and eliminate the need to retain any magneto as a backup. Each E-MAG contains

its own self-powering alternator, so dual E-MAGs provide independent redundancy on both sides with no external backup batteries needed.

■ **Shortcut:** If you want everything in one box, see the **Complete Ignition Kits (EMK series)** table at the top of this guide — the kit includes the ignition module, harness, incidental kit, and adapters in a single order.

Step 2: Select Your Spark Plug Adapters

E-MAG ignitions use 14mm automotive spark plugs, but aircraft engines are threaded for 18mm plugs. You'll need auto plug adapters to bridge this difference. The key is matching the adapter to your cylinder's thread depth:

How to identify your cylinder type:

- Look at the spark plug part number printed on your existing aircraft plugs
- If it contains the letter "M" (e.g., REM series) → you need **Short Reach (SR)** adapters
- If it contains the letter "B" (e.g., REB series) → you need **Long Reach (LR)** adapters
- You can also measure directly: SR $\approx$ 1/2" thread depth, LR $\approx$ 3/4" thread depth

Adapter Type	4-Cylinder Kit	6-Cylinder Kit	Single (Replacement)
Short Reach (SR)	EMA74001	EMB60401	EMC01101
Long Reach (LR)	EMA73001	EMB60301	EMC01201
Extra Long Reach (LRX)	—	EMB60501	EMC01301

■■ **Important:** Always install the spark plug into the adapter first (finger-tight), then install the combined assembly into the engine. Torque to 18 ft/lb through the spark plug only — never torque the adapter directly.

Step 3: Choose Your Spark Plugs

Once you know your adapter type, select the matching automotive spark plugs. E-MAG recommends the following:

Cylinder Type	Recommended Plug	Part Number
Short Reach (SR)	NGK BR8ES (standard electrode)	BR8ES
Short Reach (SR)	NGK BR8EIX (iridium — longer service life)	BR8EIX
Long Reach (LR/LRX)	Denso IKH27 (iridium)	IKH27

Set plug gap to **0.030"–0.035"** for all E-MAG applications. Replace plugs at **125-hour** intervals.

Step 4: Select Your Plug Wire Harness

E-MAG ignitions require their own custom low-noise, distributed-inductance plug wire harness — your existing magneto harness cannot be reused. Harnesses are available pre-assembled or as trim-to-fit kits.

Application	Part Number
4-Cylinder harness	EMA75001
6-Cylinder, 90-degree boots	EMB75020
6-Cylinder, straight boots	EMB75030
6-Cylinder, IO-540 Thunderbolt	EMB75050
Pre-wired control harness, 96", straight	EMB04201-B
Pre-wired control harness, 96", 90-degree	EMB04201-B90
Pre-wired control harness, potted plug	EMB04401-1

If fabricating your own harness, you'll also need the **EMC05301 Crimp Tool** to properly terminate the wire ends.

Step 5: Add the Incidental Kit

Every installation requires an **Incidental Kit**, which provides the mounting gasket, MAP pressure tubing, fittings, and control plug connector hardware. These are included in the Complete Ignition Kits (EMK series) but must be ordered separately if purchasing modules individually.

Application	Part Number
4-Cylinder	EMA00301
6-Cylinder (variable timing)	EMB25001
6-Cylinder (fixed timing)	EMB25101

Step 6: Check Your Mounting Hardware

Before installing, verify your existing mounting studs and clamps are compatible with the E-MAG's **0.19" thick flange**. Standard magneto clamps designed for 0.31" flanges will not work.

- If your existing studs are long (~1.75" exposed), replace them with **EMC65101 Short Studs** (~0.75" exposed)
- Verify clamp compatibility or order replacement **EMC66301 Clamp Mounts**
- Tighten mounting clamps to **17 ft/lb**

Complete Installation Checklist

What You Need	Part	Notes
■ Ignition module(s)	EMK series kit OR individual module	1 or 2 depending on single/dual install
■ Auto plug adapters	SR, LR, or LRX kit	Match to cylinder thread depth
■ Automotive spark plugs	BR8ES or Denso IKH27	4 plugs per ignition (4-cyl), 6 per ignition (6-cyl)
■ Plug wire harness	Matched to engine/cylinder count	Cannot reuse existing magneto harness
■ Incidental kit	EMA00301 / EMB25001 / EMB25101	Included in EMK complete kits

What You Need	Part	Notes
■ Short mounting studs	EMC65101	Only if replacing long magneto studs
■ Mounting clamps	EMC66301	Only if existing clamps are incompatible
■ Crimp tool (if fabricating harness)	EMC05301	Required for trim-to-fit harness builds
■ Switch kit (boosted engines)	EMB05101	Required for turbocharged/supercharged installs

Not Sure Where to Start?

If you'd like to keep it simple, our **Complete Ignition Kits (EMK series)** bundle the ignition, harness, incidental kit, and adapters into a single order. Just tell us your engine type (Lycoming or Continental), cylinder count (4 or 6), spark plug reach (SR or LR), and whether you want a single or dual installation.

For experimental aircraft use only.

Questions? Contact us — we're happy to help you select the right combination of parts for your specific engine build.