

## Lucas Constant Energy Ignition (1982-87) for XJ6 S3

**BENEFITS:** Roger Bywater describes the reasoning Jaguar adopted the Constant Energy Ignition system: "The 12.5:1 compression of the H.E. V-12 was too much for OPUS to fire and in any case, it was getting to be a bit primitive by that time as it had no means of current control other than via the ballast resistor. The Constant Energy system has a "timed turn on" feature which maximizes the coil charging time at high speeds whilst at lower speeds it limits current to a predetermined level. This makes possible the use of more powerful coils with lower primary resistance.

**TROUBLESHOOTING:** Randy Wilson sends this procedure: "With the engine cranking, check for:

- Power to the ballast source
- Power to the coil + post
- Ground switching on coil - post (if so, you should have spark)
- Ground to amplifier case

"If everything passes except the ground switching on the coil, then it's in the amplifier or its wiring. "A scope put on the pickup leads should give a modified sine wave pattern typical of magnetic induction sensor. At crank speed, I *think* it's around 1.5V peak-to-peak. No scope pattern is a bad pickup."

"I've never personally seen the pickup go bad but have run into cracked wires in the pickup harness. Quite often jiggling the harness will cause the problem to "correct" itself; sometimes for many years. Everything working fine after doing the scope check is bad pickup wires."

**IGNITION AMPLIFIER** -- This unit is clearly labeled "Lucas" and "Made in UK". The catalogs call for a part number DAB102 (2 wire) or DAB106 (4 wire) and cost from \$250 to \$350. Best to repair the Amplifier yourself.

**Recommendations:** Replace 4 pin GM HEI module; with a Petronix D72000 (\$75), a new ACDelco D1906 (\$35) or a new Delphi DS10071 (\$23) (GM 19180771). Stay away from "New Old Stock" and undocumented units from China, original specifications units were not reliable. "Meeting or exceeding" OEM 30-year-old spec. is not optimal). New specification production modules will allow you install a lower resistance coil (original 1.5-ohm coil down to a new 0.6 - 0.9-ohm ignition coil) and **increase** the spark plug gap by **.005" over book.**

- D72000: (California approved) Multiple sparks thru the entire RPM range.
- Adaptive dwell maintains peak energy throughout the entire RPM range, reducing misfires while improving engine performance.
- Peak current level is reached just prior to spark for maximum energy without the heat build-up, increasing coil performance and module reliability.
- Adjusts spark timing at higher RPMs to compensate for the inherent electronic delay.
- Senses startup and increases energy for quicker, easier starting.
  
- D1906: Feature electronically welded lead connections to reduce heat stress failure or cold joints
- laser trimmed to provide precise values and reduce deterioration and damage
- Increase voltage for the spark plugs to ignite the air/fuel mixture
- Include a copper slug heat sink to help dissipate heat and create a more stable environment
- Equipped with a large bus bar for added support and conductivity to address the installation and operating forces that stress terminal tabs
  
- DS10071: Original Equipment design and process ensures adequate heat transfer & durability
- Has short circuit, over-voltage and Electrostatic Discharge (ESD) protection
- Has internal current limit and precise voltage clamping circuits

**My 1984 XJ6 Ser 3 "California Car":** I used the D72000 for primary installed amplifier, and the DS10071 for my spare amplifier. The D72000 showed a significantly smoother idle than the DS10071. The DS10071 module performed on test, like the original Lucas/GM unit. The car had a slight irregular idle when purchased. I think the Extra \$40 for D72000 was worth it. Pertronix **45001 Flame-Thrower II 45,000 Volt-0.6 ohm ignition Coil**. Spark Plugs: **NKG 1233 BPR5EY V-Power Plug (.040" gap)**. California XJ6 Ser III: 17 degrees at 800 RPM & 33 degrees at 3000 RPM (TB and manifold vacuum line capped). Timing at 3000 RPM is important, idle can be slightly off target.

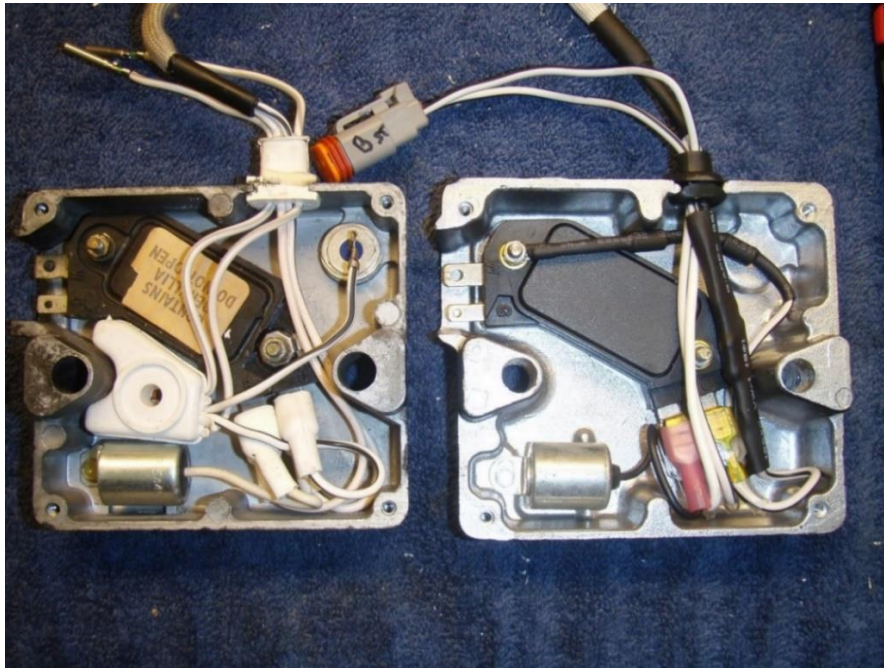
## AB14 Amplifier Internals:

The Lucas 1.0uf capacitor is not available. Most all US cars with the 4 pin GM HEI Ignition system used a .3uf RFI (Radio Frequency interference) capacitor before 2000, later cars are using .47uf/250 volts capacitors for ignition coil RFI. You will have to modify mounting tab for installation inside amplifier, or you can just put the capacitor on Ignition coil mounting bolt. **MOPAR 5149011AA Ignition Capacitor (\$15), MOPAR 4606866AA, Standard RC26 or similar.**

The Lucas 350-volt clamping Zener diode is not available. Although the current 4 pin module shouldn't need extra external protection from a 350 Volt clamping diode, you can wire a 190-volt and a 160-volt clamping diode in series to achieve the desired 350-volt protection. **(1N5387B, 190V, 5W ZENER DIODE) (\$1.10) and a 1N5384B, 160V, 5W ZENER DIODE (\$1.10) (E-Bay) Ground one end to one of the two mounting screws for the ignition module.**

The Lucas AB14 4-wire units (DAB106) are the same as the 2 wire units (DAB102), except for 2 internal resistors circuits, one for the Tachometer (10K) and one for EFI triggering (6.8K).

“Unbolt the amplifier from the front/top of the intake manifold. On back side, remove four small screws and remove the cover, you will see the components inside. The most predominant component is a **GM High Energy Ignition (HEI) module**. “(5) Screws for mounting back-plate and condenser are **M3 x 8mm Philips with M3-star washers**.”



**Left picture is Original 4 wire amplifier**, with two resistors in rubber housing, just above the condenser (RFI capacitor), and the Lucas Zener Diode is on top right corner.

**Right picture is current aftermarket amplifier** with (2) resistors in shrink-wrap and (2) Zener diodes in series inside shrink-wrap, grounded to left Ignition module attachment screw.

Original 2 wire amplifiers look the same, without the (2) resistors circuits. Most of the different Lucas AB14 Part Numbers, relate to the lead wire length, color and type of connectors, the internals are the same. They were used on Jaguars, MGBs, Triumphs and Land Rovers. All used the GM HEI 4 pin Module design.

Each of the (3) Ignition Modules came with Heat sink thermal paste and instructions for installing. Non-OEM Replacement screws for mounting the modules are M4 x 25mm Philips screws. Use two **M4**-star washers one under head and one under nylon insert self-locking nuts. Instructions call for **6-8” pounds of torque**. If you need more thermal paste; “**Arctic Silver**” thermal compound for computer CPU’s works, available at any computer store. (3.5 grams for \$5.10). Always clean off old paste if you are reinstalling a module (acetone).

Note corrosion around bolt holes on this used amplifier (4 places). All the mounting bolts/screws are the electrical grounds for module, so I put Dielectric Bulb-Grease under the heads, washers and nuts to prevent corrosion; also put Bulb Grease on the 4 pins of module.



### **Overhauled Lucas AB14 Ignition Module** (XJ6 S3 Spare Amplifier)

I added (2) 38mm x 38mm x 10mm **Heat Sinks** to my spare amplifier with the new Delphi DS10071 module. The original Lucas Capacitor and Zener Diode checked good; all new wire (one gauge heavier) in Expandable Braided Loom and new spade connectors protected with shrink wrap. (Total under \$40)

Heat Sinks (\$1.00 each) with peel-&-stick thermal adhesive/paste form E-Bay USA, shipped free from China (18 days). Cheap added protection.

Same spec as **Lucas AB14 DAB102, (47259A)**; for 1982-85 Jaguar XJ6 Ser 3  
**Green wire** is same as OEM **white with black stripe**. (was originally a MGB amplifier)



## Replacement RFI Capacitor and Zener Diode combo



**MOPAR 5149011AA Ign. Capacitor (250 volts 0.47uf). Dimensions (3/4" x 7/8" x 9/16") Modified mounting tab**

**1N5387B, 190V, 5W ZENER DIODE and 1N5384B, 160V, 5W ZENER DIODE**

## Jaguar/Lucas 2 wire amplifier wiring system diagram.

The replacement condenser (RFI capacitor) can be mounted within the amplifier, or on the Coil mount itself. Jaguar wiring is typically one wire gauge smaller than shown in this GM layout. (12>14, 14>16, 16>18 Gauge.)

- Jaguar XJ6 S3:
1. C to (-) terminal of Ignition Coil = White with black stiped wire
  2. B to (+) terminal of Ignition Coil = White wire
  3. IGN SW to (+) terminal of Coil = Brown (or White) wire
  4. EFI to (-) terminal of Ignition Coil = White with Black wire
  5. Tach to (-) terminal of Ignition Coil = Slate with Blue spiral stripe wire

