

## Installing the Hot-Spark Electronic Ignition Conversion Kit

in certain 4-cylinder and 6-cylinder Autolite/Prestolite

Non-vacuum-advance Distributors

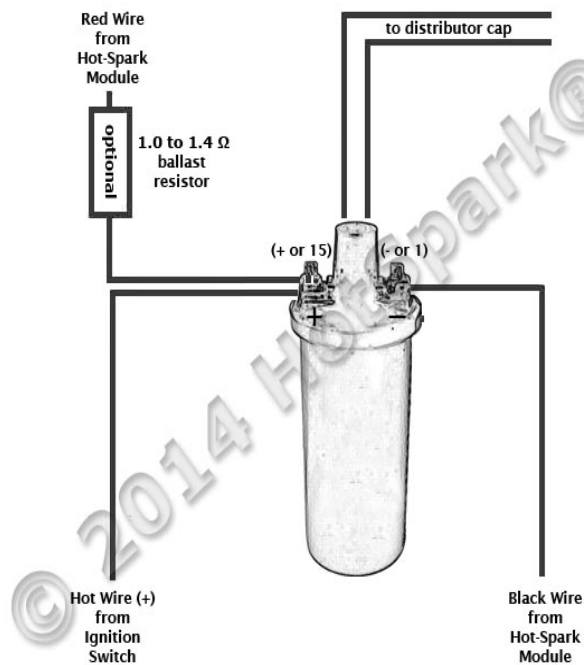
*for 3AUT4U1, 3AUT6U1, 3AUT4U2, 3AUT6U2 ignition kits*

*Applies to red Hot-Spark 3-series ignition kits*

**Warning: Reversing the red and black ignition wires will destroy the ignition module.** The Hot-Spark module's red wire connects to positive (+ or 15 on Bosch coil). The black wire connects to negative (- or 1 on Bosch coil). Remove the condenser and its wire from vehicle. Connect any other wires to the coil in their original positions. This module is designed for 12V negative ground applications only.

**Test Maximum Charging System Voltage:** If the charging system voltage, measured at the coil's positive terminal, is more than 13.7 volts at any RPM level, the voltage regulator likely needs replacing. Too much voltage can destroy the ignition module and other electronic components. A maximum charging system voltage of 12.5 volts or so is plenty. A quick fix is to wire a [1.4 Ohm external ballast resistor](#) between the coil's + terminal and the HotSpark ignition's red wire.

Make sure that the ignition wires have plenty of slack inside the distributor and are not rubbing on any moving parts. It's best to use a small zip-tie, on the inside of the distributor, where the ignition wires exit, to keep the wires from being pulled into contact with moving parts. If you need to extend the length of the ignition wires, use 20-gauge (AWG) wire. Crimp tightly or solder all connections.



**Remove points, condenser and condenser wire from distributor.** Remove the condenser and its wire from the vehicle.

**Coil Required:** Do not use a low-resistance coil that does not have the minimum primary resistance required by the ignition module, as stated in the instructions (minimum 3 ohms, assuming a 12-Volt electrical system). The coil resistance regulates the current in the ignition module/coil circuit. Too little coil primary resistance results in too much amperage going to the ignition module, which can overheat the electronics. The failure may not happen immediately, but the excess heat will shorten the life of the ignition module electronics. How long the electronics will last depends on how much heat is generated. It could be a matter of a couple of hours to a few hundred hours, depending on temperature.

**To measure coil primary resistance:** Label and remove all wires to coil ( + or - ). Using a common digital multimeter in the 200  $\Omega$  mode, cross the red and black leads of the Ohmmeter. Allow 10 seconds or more for the reading to settle and write down the reading. Still in the 200 Ohm mode, measure between coil's + and - terminals. Allow a few seconds for the reading to settle, until it stabilizes. Subtract the previous reading, taken with the leads crossed, to compensate for Ohmmeter's inherent resistance. Do not use a low-resistance coil, such as the MSD or Accel coil; they don't have enough primary resistance for this application. For best performance, the coil should also have 7,000 Ohms or more secondary resistance (measured from coil's + or - terminal to center high tension terminal, in the 20K  $\Omega$  mode of the Ohmmeter).

**Ballast Resistor:** If the coil's primary resistance is not quite enough or is borderline, you can wire an external ceramic ballast resistor (with 1.0 to 1.4 Ohms resistance) between the coil's + terminal and the red HotSpark ignition wire: [www.HotSpark.com/1-HS14BR.htm](http://www.HotSpark.com/1-HS14BR.htm)

**Test Maximum Charging System Voltage:** If the charging system voltage, measured at the coil's positive terminal, is more than 13.75 volts at any RPM level, the voltage regulator likely needs replacing. Too much voltage can destroy the ignition module and other electronic components. A maximum charging system voltage of 13.7 volts or so is plenty. A quick fix is to wire a 1.4 Ohm external ballast resistor between the coil's + terminal and the HotSpark ignition's red wire.

**Test Battery Voltage to Coil:** With ignition switch ON, engine not running, check voltage at coil's + terminal. The voltmeter should read somewhere around +11 to +13 volts. If voltage is too low or there's no reading, the battery's terminals or ground connection may be corroded and need cleaning or the battery may need charging. Some vehicles have a resistor wire running from the ignition switch to the coil's + terminal. If this resistor wire drops the voltage below 9 volts or so, you may need to run a non-resistor wire from the ignition switch to the coil's + terminal or run a +12V wire directly from the ignition switch to the red Hot-Spark ignition wire. Make sure that the ignition switch terminal to which you connect this wire has power only when the ignition switch is in the ON position. Or, you can, for temporary testing purposes only, run a wire directly from the battery's + terminal to the coil's + terminal, the Hot Spark ignition's red wire to the coil's + terminal and the black Hot-Spark wire to the coil's - terminal. Do not leave the wire from the battery connected to the coil's + terminal for more than a minute or so without the engine running.

**Air Gap between Magnet Sleeve and Ignition Sensor:** If you need to increase air gap slightly, hold ignition base plate away from distributor shaft while tightening set screw and/or loosen the two Allen head screws and retighten screws while lightly prying ignition module away from magnet sleeve. Do not over-torque these Allen screws. Black magnet sleeve should not rub against red ignition module, but exact gap is not critical. In rare instances, it may be necessary to gently pry red ignition module away from black magnet sleeve to keep them from rubbing together.

**Ignition Timing:** Set the ignition timing, using a stroboscopic light, to the distributor's factory specification. The difference in distributor position with points vs. electronic ignition can be as much as 30 degrees or so clockwise or counterclockwise, so you'll definitely have to reset the timing. **The old method of setting the timing statically, using a simple 12-volt test lamp, doesn't work** with electronic ignition, as it does with points. The only way to bench-test a distributor is by using a distributor testing machine. In other words, the distributor needs to be mounted in the engine and tested and/or timed using a stroboscopic timing light, connected to number one cylinder's spark plug wire.



***3AUT4U1/3AUT6U1 Ignition Kit Replaces Entire Breaker Plate***



***3AUT4U2/3AUT6U2 Ignition Kit Replaces Entire Breaker Plate***

1. Turn off the ignition switch and/or remove the ground strap from the battery. Though not absolutely necessary, it is probably easiest overall to remove the distributor from the car before installing the Hot-Spark module. If the contacts in the inside of the distributor cap are worn or damaged, replace the distributor cap. Replace the rotor if it's worn.
2. Remove distributor cap, leaving the plug wires in place, unless replacing the distributor cap as well.
3. Make a mark with a felt pen on the rim of the distributor, close to the center of the points. The new red ignition module should align, somewhat, with this mark. Remove breaker plate, points, condenser and their wires from the distributor. Because

the Hot-Spark kit does not modify the distributor, the old breaker plate with points and condenser can be reinstalled at a later time, if desired.

4. Clean any grease or dirt from the distributor shaft's points cam.

5. Replace the entire old breaker plate with the new Hot-Spark breaker plate, using the same screws in the same holes as the old breaker plate or if the breaker plate has upright tabs, secure with short bolts, lock washers and nuts.

**3AUT4U1/3AUT6U1:** Ignition kit for 4-cylinder or 6-cylinder Autolite/Prestolite distributors with centrifugal advance only. Not for vacuum-advance distributors. Replaces entire breaker plate. Use existing vertical screws to attach replacement breaker plate to distributor. Press the magnet sleeve down, as you turn it left and right, until the magnet sleeve starts to slip over the lobes of the distributor shaft. Press it down as far as it will go. 4-cylinder: If the rotor doesn't extend far enough down to keep the magnet sleeve in place, you may need to use a zip-tie, tightened very snugly, around the distributor shaft, on top of the magnet sleeve, to keep the magnet sleeve in place, to prevent the magnet sleeve from sliding up too far, where the magnets don't align with the ignition sensor. Set the timing with a stroboscopic timing light, according to factory specifications. **6-cylinder:** Because different Autolite distributors can have varying distributor shaft heights, the raised lip of the top of the magnet sleeve may or may not need to be ground down to allow the rotor to seat fully.

**3AUT4U2/3AUT6U2:** Ignition kit for 4-cylinder or 6-cylinder Autolite/Prestolite distributors with centrifugal advance only. Not for vacuum-advance distributors. Replaces entire breaker plate. Replacement breaker plate has upright tabs. Remove old breaker plate with points and condenser and replace with new breaker plate, using short bolts, lock washers and nuts, horizontally, to secure breaker plate to sides of distributor body. Press the magnet sleeve down, as you turn it left and right, until the magnet sleeve starts to slip over the lobes of the distributor shaft. Press it down as far as it will go. Set the timing with a stroboscopic timing light, according to factory specifications. **6-cylinder:** Because different Autolite distributors can have varying distributor shaft heights, the raised lip of the top of the magnet sleeve may or may not need to be ground down to allow the rotor to seat fully.

6. Install magnet sleeve, with the larger opening down. Turn the magnet sleeve left and right, while pushing down firmly, until you can feel the distributor shaft cam lobes line up with the flat spots inside the magnet sleeve. Press down firmly until the magnet sleeve slides as far down as it will. Install the rotor on top of the magnet sleeve, making sure the rotor is aligned with the slot in the top of the distributor shaft. The rotor should slide all the way down and lock into place, so that it cannot turn independently of the distributor shaft. If you can still turn the rotor independently of the distributor shaft, the magnet sleeve and/or rotor is not seated all the way down.

**A small oval plate and metric hex-head screws may have been included** with the ignition kit in case you need to boost the height of the red ignition module to align with the magnets inside the magnet sleeve.

**An O-Ring may have been provided** to raise the height of the magnet sleeve, if that is needed instead. Install the O-Ring around the distributor shaft, underneath the magnet sleeve.

Early distributors have distributor shafts that may vary in height, depending on the wear, number and thickness of the distributor shaft shims inside the distributor.

**Magnet sleeve positioned too high:** Situation: The fit between the distributor shaft and the magnet sleeve is especially tight and you can't slide the magnet sleeve down onto the distributor shaft all the way. The rotor rides too high, causing the distributor cap to wobble when you rotate the distributor shaft. Fix: Rotate the magnet sleeve so that it lines up with the lobes of the distributor shaft cam and the magnet sleeve can slide down a bit. Install the rotor and tap, with a small hammer or a soft rubber mallet, *very gently*, on the center of the rotor, until the magnet sleeve seats firmly onto the distributor shaft, over the distributor cam lobes. With the rotor and distributor cap installed, you should be able to rotate the distributor shaft without the distributor cap wobbling.

**Rotor rides too high, rubbing against distributor cap:** With the magnet sleeve, rotor and distributor cap installed, the distributor shaft should spin as freely as it would without the rotor installed. If it feels like it's dragging, either the magnet sleeve is not fully seated or you'll need to grind off some of the top of the raised magnet sleeve lip or from the bottom of the rotor, until the distributor shaft spins freely with magnet sleeve, rotor and distributor cap installed. **6-cylinder:** Because different Autolite distributors can have varying distributor shaft heights, the raised lip of the top of the magnet sleeve may or may not need to be ground down to allow the rotor to seat fully.

**Magnet sleeve fit too loose:** If the fit between the distributor shaft lobes and the magnet sleeve is too loose, the distributor shaft may be worn down from years of the points block rubbing on the distributor cam lobes, with accumulated dirt and grit, and/or insufficient lubrication. If the fit is especially loose, the only solution, short of replacing the distributor, may be to clean the distributor cam lobes thoroughly with alcohol and wrap the lobes with several wraps of Teflon tape, before pressing the magnet sleeve down over the lobes. Too loose a fit between magnet sleeve and distributor cam lobes may result in erratic timing. If the rotor doesn't extend far enough down to keep the magnet sleeve in place, you may need to use a zip-tie, tightened very snugly, around the distributor shaft, on top of the magnet sleeve, to keep the magnet sleeve in place, preventing the magnet sleeve from sliding up too far, where the magnets don't align with the ignition sensor.

7. Adjust the two Hot-Spark ignition wires so that they have plenty of slack inside the distributor and they're not rubbing on any moving parts. Install the grommet into the hole left where the condenser wire bolt used to be. It's a good idea to secure the ignition wires inside the distributor, next to where they exit the distributor case, with a plastic zip tie. Cut off the excess zip tie.

8. Reinstall the distributor.

9. Install the distributor cap.

10. The Hot-Spark module's red wire connects to positive ( + ). The black wire connects to negative ( - ). DO NOT reverse the polarity of these wires or the ignition module will be destroyed.

11. Check all wire connections, including the two Hot-Spark wires and the spark plug and coil high-tension wires. If you need to extend the length of the wires, use 18- or 20-gauge wire. We recommend soldering all splices and connections, if you can, or crimp all connections tightly. Make doubly sure that all wires are connected to the proper terminals, etc. before reconnecting the battery or turning the ignition switch to the ON position. Make sure that all connectors are snug. Reconnect the battery and set the distributor timing statically.

12. You can set the timing statically to about 0° (TDC) at first, so that the engine will start. You may need to turn the distributor, a little at a time, right or left, to enable the engine to start and remain running. Time the engine with a stroboscopic light in the normal manner.

**Setting Timing:** This will probably be the last time you have to set the timing for a long time, so it's worth it to spend the extra time and effort to set the timing absolutely spot-on accurately. An engine with its timing set to perfection will start with the slightest bump of the starter and purr like a kitten at idle – something to make you feel good every time you start the engine.

TDC = Top Dead Center, or 0° BTDC = Before Top Dead Center ATDC = After Top Dead Center

## Wiring Installation Basics:

**Test Maximum Charging System Voltage:** If the charging system voltage, measured at the coil's positive terminal, is more than 13.75 volts at any RPM level, the voltage regulator likely needs replacing. Too much voltage can damage the coil, ignition module and other electronic components. A maximum charging system voltage of 12.7 volts or so is plenty. A quick fix would be to wire an external ballast resistor between the coil's + terminal and the red HotSpark ignition wire.

1. Begin with a fully-charged battery. Touch the red lead of a voltmeter to the coil's positive ( + ) terminal. Touch the voltmeter's black lead to engine ground. With the ignition switch on, engine not running, measure the voltage at the coil's positive ( + ) terminal. The reading should be somewhere around +12.5 volts, or battery voltage. If voltage is too low or there's no reading, the battery's terminals or ground connection may be corroded and need cleaning. Some vehicles have a resistor wire running from the ignition switch to the coil's + terminal. If this resistor wire drops the voltage below 10 volts or so, you may need to run a non-resistor wire from the ignition switch to the coil's + terminal or run a +12V wire directly from the ignition switch to the red Hot-Spark ignition wire. Make sure that the ignition switch terminal to which you connect this wire has power only when the ignition switch is in the ON position.

Measure voltage, with voltmeter in the 20 DCV mode, red lead on coil's + terminal, black lead on engine ground. With

engine running at 2,000 RPM or more, the voltage reading should not be more than +13.7 volts. If reading is more than +13.7 volts, you may need to wire a [ballast resistor](#) with 1.4 Ohms resistance, between the coil's + terminal and the red HotSpark ignition wire.

2. Remove points, condenser and condenser wire from the vehicle.

To get the ignition running initially, only these wires should be attached to the coil's + and – terminals:

A. +12 volts from the ignition switch to the coil's + terminal

B. Red Hot-Spark wire to the coil's + terminal

C. Black Hot-Spark wire to the coil's - terminal. **DO NOT connect any +12-volt wire to the coil's - terminal. Connect only the black Hot-Spark ignition wire to the coil's - terminal. Do not connect the coil's - terminal to ground.**

D. The automatic choke and fuel shut-off valve may also need to be attached to the coil's + terminal.

E. Generally, only the black Hot-Spark wire is attached to the coil's – terminal. If a tachometer wire is usually attached to the coil's - terminal, don't attach it until the timing has been set and engine is running properly. No other wires should be connected to the coil's + and – terminals at this time.

F. **Static timing, using an ordinary 12-volt test lamp, will not work.** Attach a stroboscopic timing light to the spark plug wire of cylinder number 1. With engine rotated to TDC (0 degrees) on the firing stroke of Cylinder number 1, ignition switch ON, turn the distributor until the timing light flashes. You may need to turn the distributor left or right, a little at a time, until the engine will stay running, so that you can set the timing with the engine running, using a stroboscopic timing light, according to factory specifications.

G. For testing purposes, no other wires should be attached to the coil terminals, except for the center high-tension lead to the distributor cap.

Attach a stroboscopic timing light to the spark plug wire of Cylinder number 1. With engine rotated to TDC on the firing stroke of Cylinder number 1, ignition switch ON, slowly turn the distributor clockwise or counter-clockwise until the timing light flashes. Tighten the distributor clamp a little, so that you can still turn the distributor by hand, but the distributor won't turn on its own. The rotor should be pointing to number 1 cylinder's spark plug wire.

Start the engine. You may need to turn the distributor left or right a little, until the engine will stay running, so that you can set the timing with the engine running, using a stroboscopic timing light, according to factory specifications.

**Distributor Cap and Rotor:** Stock Autolite/Prestolite rotors and distributor caps work fine with the Hot-Spark module. A worn, corroded or scored distributor cap and/or rotor is often the cause of the timing jumping around erratically at idle. We recommend installing a new distributor cap and rotor when converting from points to electronic ignition.

**Spark Plug Gap:** With the Hot-Spark ignition kit, the stock spark plug gap specification is fine. For racing purposes, you can increase the spark plug gap by about .005 inches, or .12 mm.

**Hot-Spark Ignition and MSD 6 Series Wiring Diagram:** [www.Hot-Spark.com/Hot-Spark-MSD-6-series.jpg](http://www.Hot-Spark.com/Hot-Spark-MSD-6-series.jpg)

**Using Hot-Spark Ignition with VDO Tachometer:**

Connect a diode #1N4005 between the negative terminal ( - ) of the coil and the wire that goes to the tachometer. The cathode end (silver band) should be nearest the tachometer side, not the coil side. You should be able to buy a diode #1N4005 at Radio Shack or other electronic supply store.

**Latest On-Line Installation Instructions:**

[www.Hot-Spark.com/Installing-Hot-Spark-Autolite.pdf](http://www.Hot-Spark.com/Installing-Hot-Spark-Autolite.pdf)



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