

Overview :

The standard ignition modules and coils (not coil pack or electronically controlled systems) fitted to many small Japanese engines aren't very wonderful. They are better than points (hell, anything's better than points...) but they are pretty marginal in terms of energy supplied to the spark plug. So what can be done easily and cheaply ?

If you have reluctor style distributor (has a star shaped wheel that generates the timing pulses, usually mounted right under the rotor button) the answer is surprisingly cheap and relatively simple.

This upgrade will work with either type of Variable Reluctance distributor pickups shown.

Hall Effect systems will not be suitable for this modification



A multi-pole reluctor system



A single-pole reluctor system

You have been WARNED !

However before you race out and start chopping into your pride and joy, read the whole article and have a careful look at your existing ignition system to ensure its essentially as described. Due to the DIY nature of this description and variation car to car there may be some challenges you have to overcome. The article is a guide - not a guarantee! Dtec accepts no responsibility should you decide to undertake this modification - its entirely at your own risk.

What you need:

Looking at the technical specifications, the old straight six cylinder Holden has the highest output module and coil fitted to readily available production cars. Go to a self serve wrecker, locate a suitable donor vehicle, and on the distributor base will be a cast flange with a sheet metal cover, under which will be a Bosch module - the last three digits should be 021. It will have four terminals.

Disconnect, unscrew it and try NOT to wipe the white heatsink paste off the module base - it helps with heat conduction to the heatsink.

You will also need the ignition coil as well as the mounting bracket and HT lead just to be safe. It's an oil filled unit (the cylinder type) but if you want a more modern looking, transformer coil then you need a Bosch HEC715 (female HT) or a HEC716 (male HT) They all perform similiarly but the HEC715 / 16 won't be common on wrecks.

If you want to purchase new components see the last page for BOSCH part numbers.



A 021 BOSCH Ignition Module

Making the modifications :

Using a timing light, establish the standard timing at idle. In order to do this you may need to refer to the manufacturers specifications to establish exactly under what conditions the timing is determined.

Before you remove the distributor from your car, and very importantly - mark the position of the rotor to the distributor body and the distributor body relative to the engine - to make it easy to reinstall. Scribe a line, Texta mark etc - but this is important - you WILL need it later.

Now for the "technical" stuff - there will be a pickup in the distributor body - that is on the same plane as the reluctor (the star shaped wheel that rotates) - with two wires from this to the ignition module.

If the ignition module is internal to the distributor, you need to cut these wires and extend them with shielded cable (like audio cable - 2 cores and a woven metal screen around them) to reach wherever your going to mount the new module. The screen must to be grounded at one end only.
If your going to remove the pickup to make the installation easier, measure the gap between the reluctor and the pickup coil. Sheets of paper / plastic etc will work fine although brass feeler gauges are the correct tool.

Make certain you insulate the joins and ends well (heatshrink) and ensure the new extended lead is clear of the rotating components of the distributor.

When selecting shielded cable, try and use a good quality silicone insulated product. Its hot and unfriendly under the bonnet so a quality cable is a good investment. Keep it away from all the hot engine bits and thermally shield if necessary - fibreglass sleeving is ideal.

If the ignition module is already externally mounted then you may well be able to use the existing trigger wiring. Check to see that the cable shield is grounded at one end only - it is important.

The old module can be removed, or left – its your choice. If you removed the old internal module, the new shielded cable may be able to exit through the existing cable grommet making for a neat installation.

If you removed the pickup from the distributor when cutting and extending the wires, then put it back and set the gap between the reluctor and pickup coil to the same gap as when it was removed and all should be well (you did measure it like we suggested didn't you.....) or if you have a factory service manual the gap will probably be provided.

Under NO CIRCUMSTANCES should the two parts touch. If you didn't measure the gap before removal remember to allow for a little wobble in the shaft due to mechanical tolerances and wear.

If the gap is too large the engine will be difficult or impossible to start - too small and damage will occur.

That's the distributor mods done.

Put the distributor back using the alignment marks – we told you they were important ! Be careful not to damage the "O" ring or oil seal between the engine and distributor body.



Mount the coil and module - a small heatsink is required for the module - so make a 3mm thick aluminium bracket about 70 x 50mm for the module and that will do. Do not run the system without a suitable heatsink.

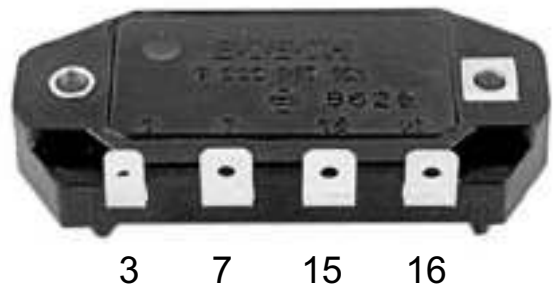
Mounting the module with the coil usually is easiest and in the same position as the stock coil, as that gives you easy access to the original loom. A new or recycled plug / socket will make the installation simpler and more professional.

If you wiped of the heatsink paste during removal of the module, electronic component suppliers usually sell it. It is important to make good thermal contact between the module and its new heatsink.

The Wiring :

The connections on the module are :

- 3 Negative input from pickup (the bit in the dissy)
- 7 Positive input from pickup.
- 15 12V for module.
- 16 Coil negative.
- Case Vehicle Ground



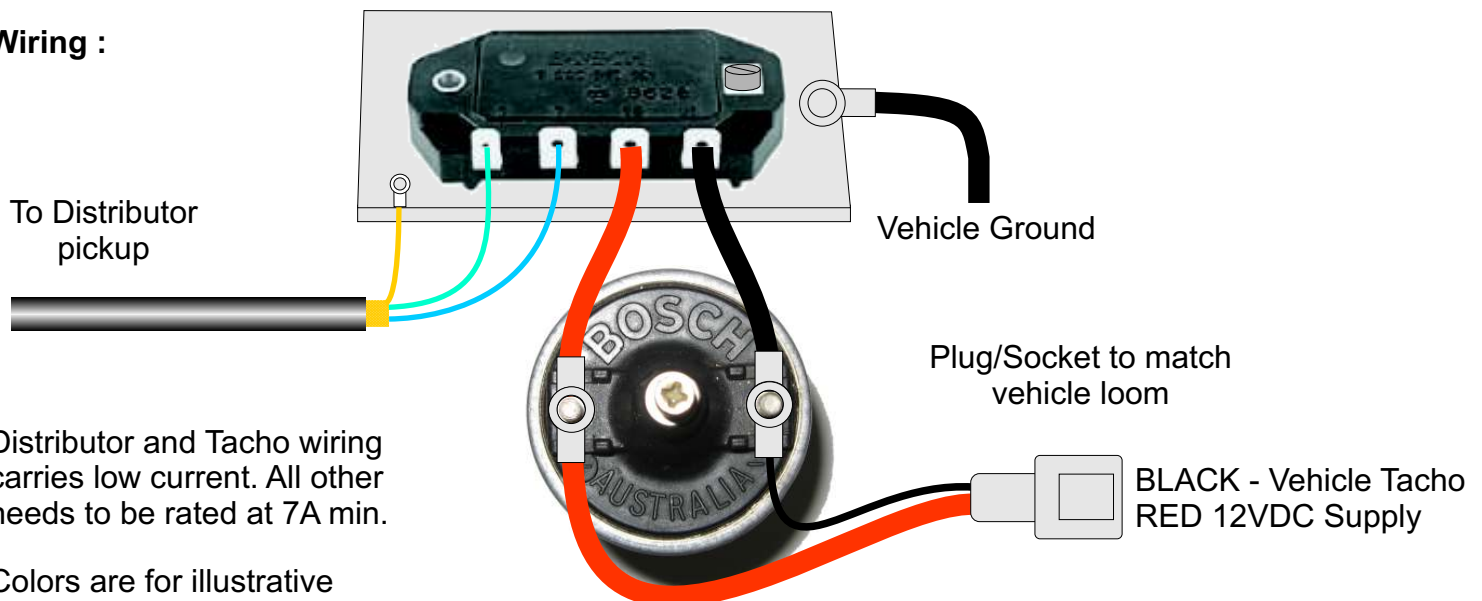
So.... ignition power goes to the coil positive terminal and to module terminal 15, a ballast resistor is NOT required. In fact a ballast wire or resistor will undo all your good work! You can pick up power from the old coil positive connection on the loom (not the old coil - just its loom connection).

Coil negative goes to module terminal 16, connect the new coils negative to the old coils negative terminal on the loom so the ECU / tacho gets ignition pulses.

The shielded cable that you have just installed goes to terminals 3 & 7 - don't make them permanent just yet. Make sure the screen is grounded at one end as described previously.

Module shell is connected to the vehicle ground via its bolted connection to the heatsink. Make certain both the module AND heatsink have a good electrical ground connection. "Star" or serrated washers may be used to assist.

Wiring :





The BIG MOMENT :

That's it... start the monster.

Get a timing light - if you have to substantially rotate the distributor body to get the timing right, then reverse the connections to terminals 3 & 7 and recheck.

This matters - reverse connection might run but the dwell control in the module will operate incorrectly. and the rotor may no longer align with the internal posts / lead connections moulded into the distributor cap,

If you have an Oscilloscope then you can verify the polarity manually. With the distributor removed (remember to mark alignment as before) - rotate the distributor drive in the normal direction of rotation and observe the pickup coils output waveform. As the pole passes the coils projecting tooth the waveform should swing positive first then go negative. You have now identified the trigger coils “+” and “-” wires so connection to the module is straightforward.

Connecting an Oscilloscope to the coil or module whilst the vehicle is running is NOT recommended.

You now have a high performance, variable reluctance triggered, inductive ignition system, powerful enough for most boosted installations let alone a stock vehicle - more than a match for OE or aftermarket systems.

Total cost second hand - depends on wreckers but \$20 is about it. New parts will obviously cost more.

Do it PROPERLY :

If your going to do this - do it properly, nothings worse than poor wiring leading to breakdowns. If your mystified by all this then DON'T ATTEMPT IT, its not that hard but some basic electrical and mechanical knowledge is required.

The underlying Bosch module and coil are very reliable, so ensure you workmanship is to the same standard.

BOSCH Part Numbers :

Number on Ignition Module : 9222 067 021

Ignition Module as a retail boxed assembly : 9222 067 024 or BIM024

Ignition Coil - cylindrical oil filled : 9 220 061 445 (or other models as specified for the “021” module)

Ignition Coil - transformer type : HEC015 (Female HT) or HEC016 (Male HT)