

Saab V4 Hall ignition

The Saab V4 Tech Source
www.saabv4.com

version 2016/03
page 1/10

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In search of more reliable motoring, many replace the original breaker points ignition system on their V4 with an electronic ignition kit from e.g. Pertronix or Aldon. Although this is a reasonably satisfactory solution, it comes with some disadvantages over a more sophisticated system as factory fitted to many cars from the early 1980s. The biggest drawback of the Pertronix system is that it can burn out if you connect the wires the wrong way around at first attempt, or leave the ignition on without the engine running. In the Volkswagen scene it's common to replace points ignition with a Hall effect system from a MKII VW Golf, Scirocco, Jetta, Passat or Audi 80/ 100 (VAG group). This system won't burn out because the ignition amplifier module automatically switches off the current if the engine doesn't run. This conversion can also be done to most V4 distributors (except the very early ones), as they are part of the same family of Bosch J(FU)4 type distributors as used on VWs.

For my 96 I got a VW distributor, coil, ignition amplifier module and wiring harness for about £25 from a classifieds website. I'm not at all experienced with electronics, but reasonably comfortable with taking stuff apart and putting it back together. The conversion is just a bit more work than the installation of a Pertronix kit, but all in all took me no more than a relaxed Sunday afternoon first time around. I did a few more later and once you get the hang of it it's actually a pretty simple job.

Take both the V4 and the VAG distributor apart and make sure to keep everything in the appropriate order. If you lay out the parts on a blank sheet of paper you can write down notes next to them if needed. Getting the roll pins out of the drive gears may take some effort; make sure you decently support a gear before attempting to hammer the pin out using a 4mm drift. Pull the gear off with a suitable puller, undo all bolts, unhook and remove the vacuum can, on the V4 dizzy remove the condenser and the points, push the breaker plate a little upwards with a big screwdriver through the vacuum can arm hole and remove the rest of the contents by gently taping the shaft from below with a soft mallet. The whole assembly should come out in one piece. Now take the contents of the distributors further apart and clean the parts thoroughly. Be very careful not to break the brittle plastic parts. If the shaft has sideways play, now is the time to correct this by replacing the upper Oilite bushing and adding one at the bottom where Bosch simply left the shaft spin in the aluminium body. If the shaft itself is worn replace it or find a better distributor to work with.

Because different distributors have different advance curves, the vacuum canister and the advance weights, springs and fixing plate are reused in the V4 distributor. Using the VAG parts means altering the advance characteristics, only do this if you know what you are doing! Since the top shaft in a VAG distributor is secured with a screw onto the main shaft and that of the Saab distributor with a lock ring, a 3.3 millimetre hole must be drilled in the top of the main shaft, and M4 thread cut. Use the VAG distributor body as a jig under a pillar drill as shown in the photo. Copy the position of the bolt holes and the connector from the VAG distributor onto the V4 one. Just to be sure measure the position of the connector again before cutting a slot in the distributor body with a hacksaw and a file. The same counts for the bolt holes, if they do not align, the rotor won't turn freely. Drill them a little over size ($\varnothing 5\text{mm}$), just like Bosch did originally, to allow for a little adjustment. The hole for the condenser wires can be plugged by reusing plastic trim bit after cutting the wires (see photo). Use some gearbox oil to lightly lubricate all moving parts.

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version 2016/03
page 2/10

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Installing the Hall effect distributor on my 96 made a huge difference compared to the points. On points it idled at an unsteady 800-850rpm whereas after fitting the Hall distributor it did 1200rpm! After resetting the idle on the carb to 800rpm, the engine started and pulled much better than before. It now runs very smoothly, also at illegally high speeds, and it must have gotten a bit more efficient on fuel as well I presume.

'80s VAG ignition parts are still relatively easy and cheap to come by (new and used), but I also wanted to see if usable parts could be found a little closer to home. I've dismantled a distributor from an 8 valve Saab 900i (0 237 021 024) and a 900/ 9000 T16 (0 237 507 001). Although the Hall sensor (Siemens HKZ101) and the shutter wheel are identical to those of the VAG distributors, the parts needed for the conversion are not suitable for the V4 without major modifications because 900/ 9000 distributors turn the other way around and most parts are mirrored. 900/ 9000 (or 90/99) coils (e.g. 0 221 122 327) and amplifier modules (e.g. 0 227 100 139 and other "smart" modules) used with Hall systems on Saabs are perfectly usable with the VAG Hall sensor assembly as far as I've tested so far.

Should you want to better understand your car's ignition system before starting a conversion, I can highly recommend the book 'How to Build & Power Tune Distributor-Type Ignition Systems' by Des Hammill. For any questions or suggestions please email me at saabv4@saabv4.com

Volkswagen Golf II (1983-1992) parts I used successfully, many alternatives work as well:

- Distributor: Bosch 0 237 020 156/ VW 050 905 205 C
- Coil: Bosch 0 221 122 349/ VW 211 905 115 D
- Ignition amplifier module: Telefunken/ VW 191 905 351 B
- Wiring harness, can be sourced from a VW/ Audi donor car (separate from main loom) or made by using a 3 way and a 7 way Junior Power Timer connector with female terminals (eBay, automotive electronics specialists or used from any donor car with a Bosch ignition/ injection system fitted, for example Saab 900). For taking used connectors apart use Laser Terminal Tool number 3932 or equivalent, or make your own tool: <http://youtu.be/bbW9Yc36RPE>



Laser Terminal Tool 3932

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version 2016/03
page 3/10

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Drilling a hole in the shaft using the VAG distributor body as a jig.

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version 2016/03
page 4/10

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Measure carefully before cutting a slot for the connector.

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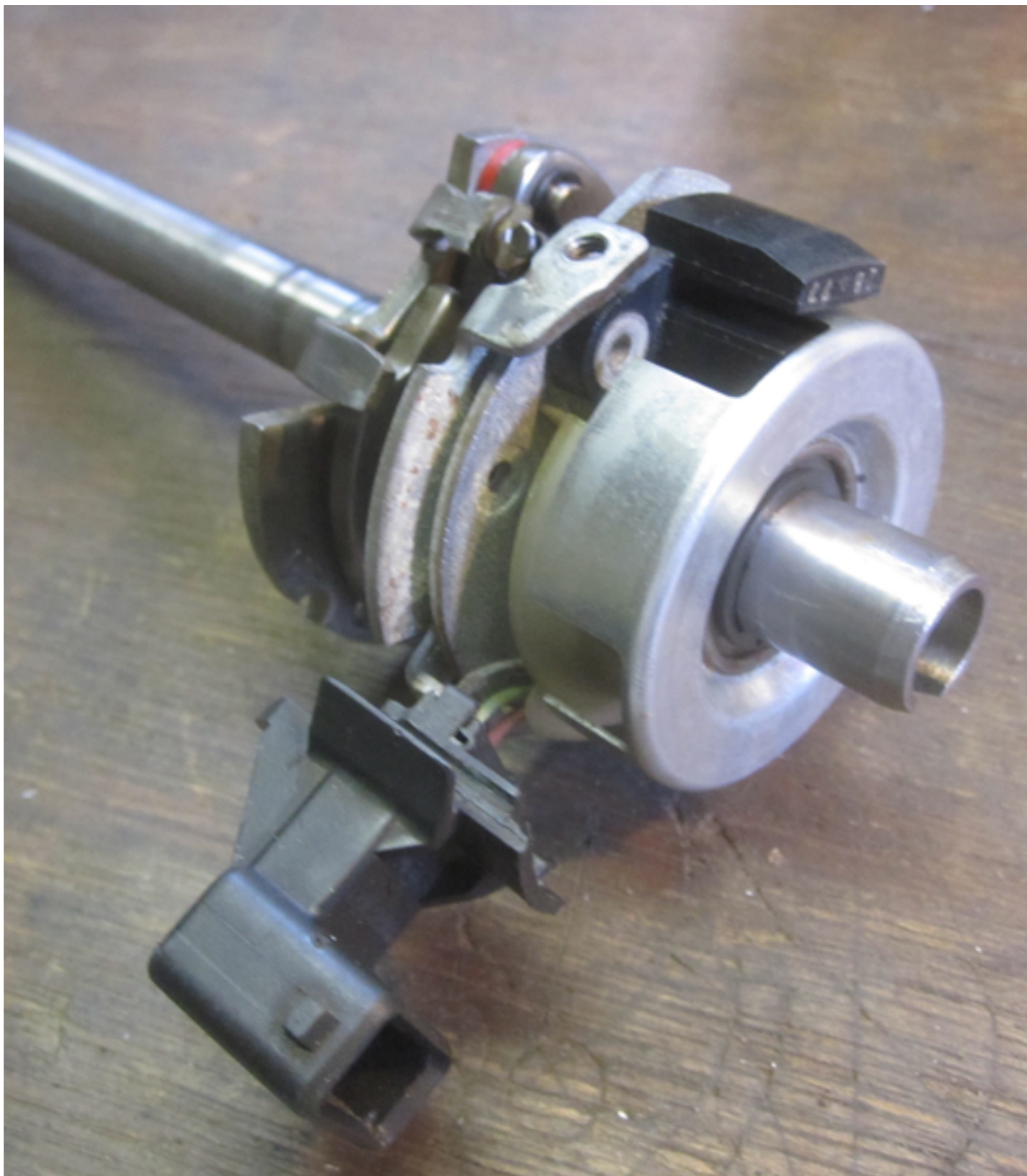
version 2016/03
page 5/10

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The Hall assembly and mechanical advance fitted on the main shaft.

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version 2016/03
page 6/10

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The uprated V4 distributor.

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version 2016/03
page 7/10

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It's a tight fit in places, but everything lines up if you work carefully.

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version 2016/03
page 8/10

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The condenser grommet can be reused after removing the wires.

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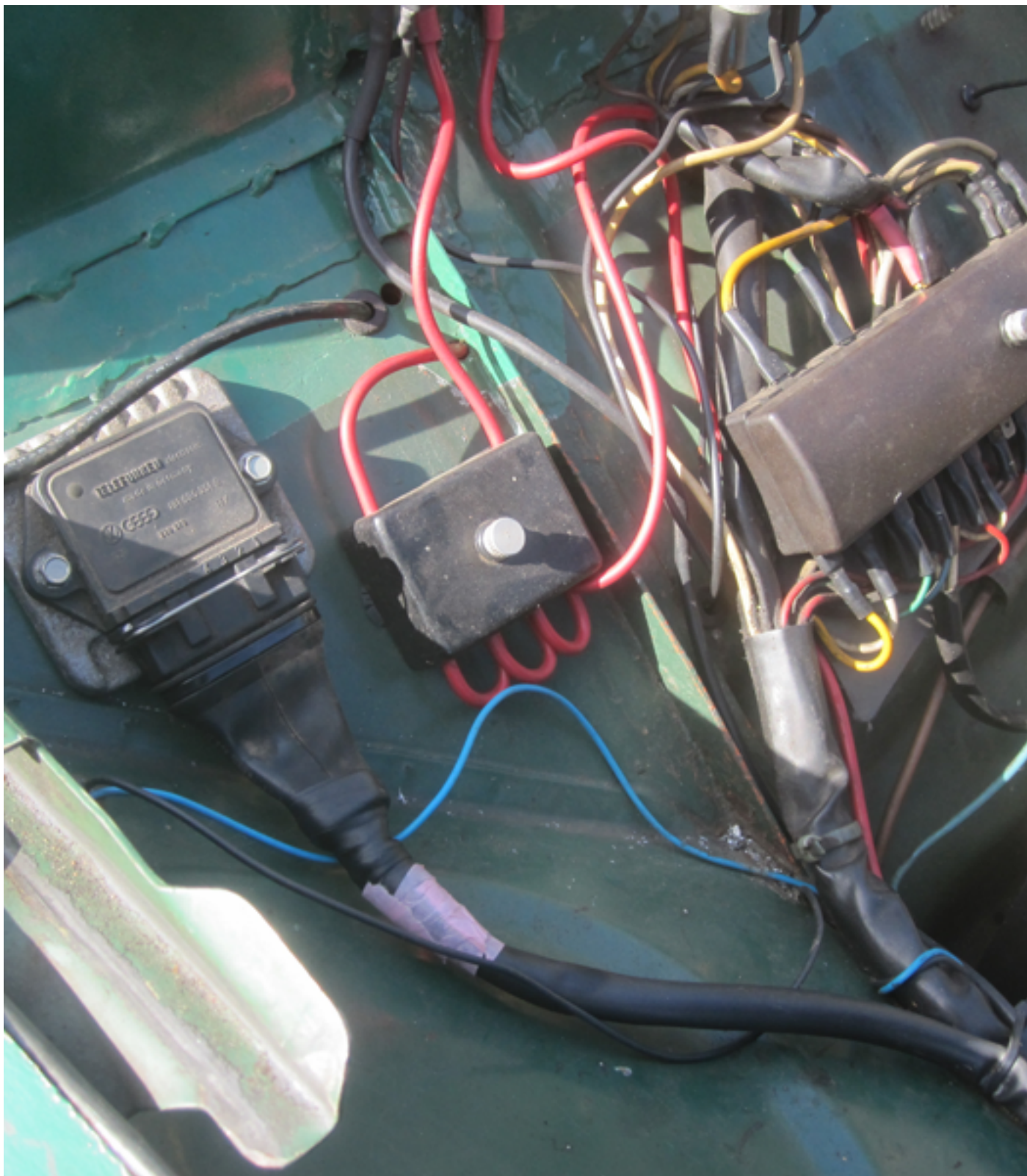
version 2016/03
page 9/10

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The amplifier module (to the left) fitted in the test mule.

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version 2016/03
page 10/10

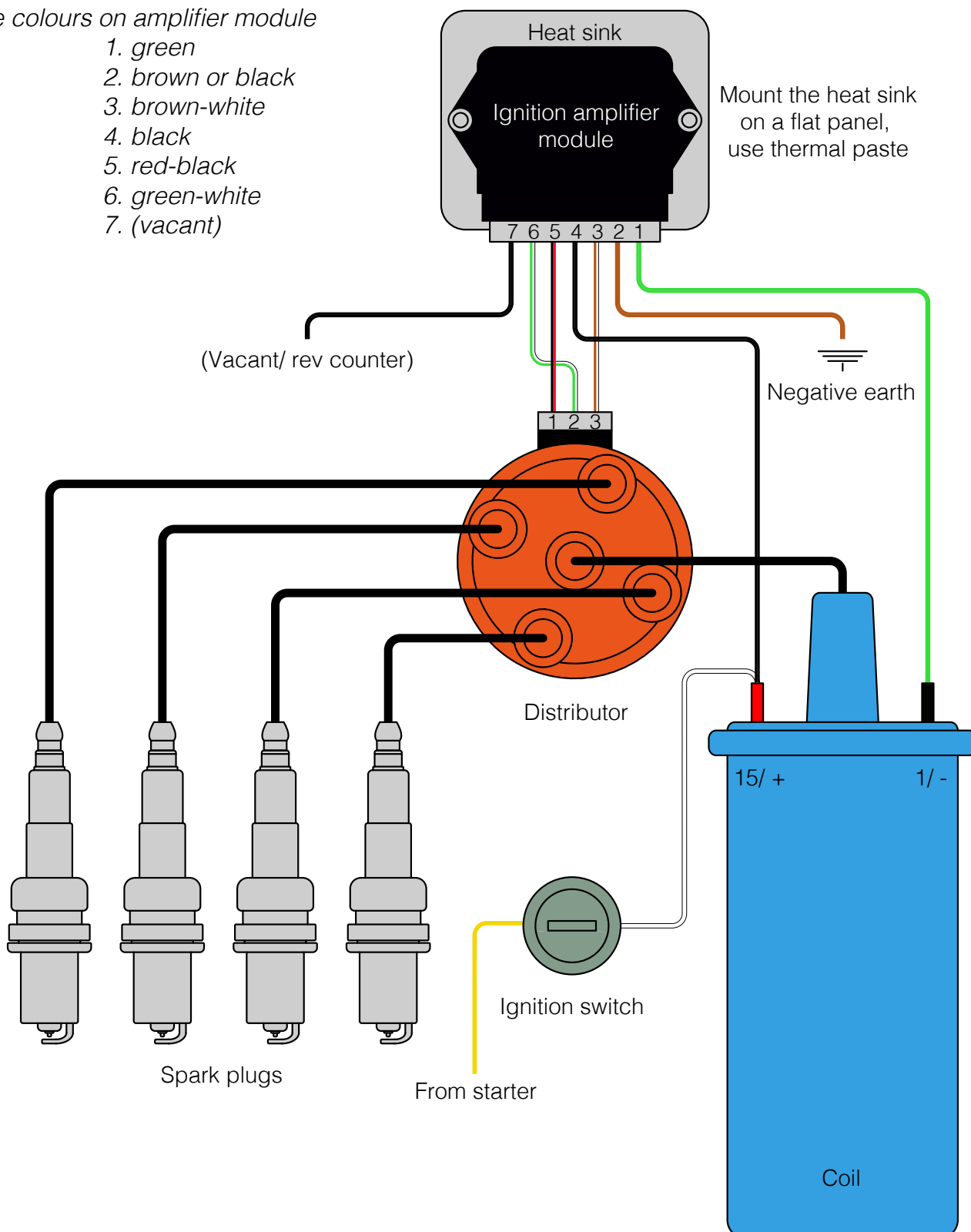


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Wire colours on amplifier module

1. green
2. brown or black
3. brown-white
4. black
5. red-black
6. green-white
7. (vacant)



Wiring diagram.