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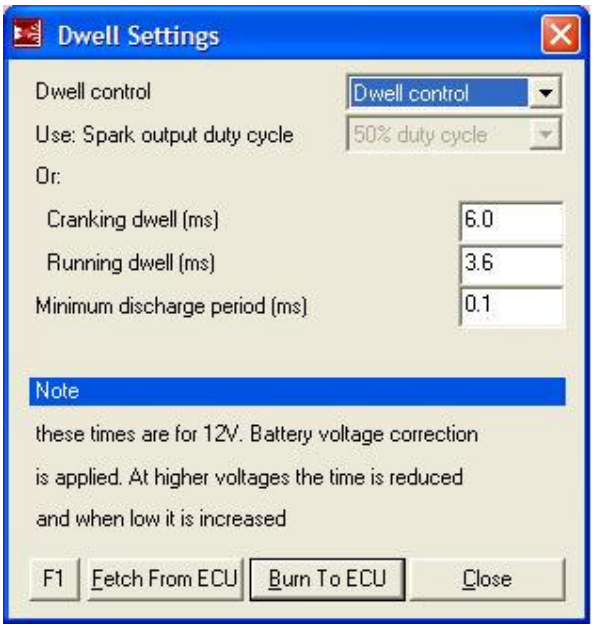
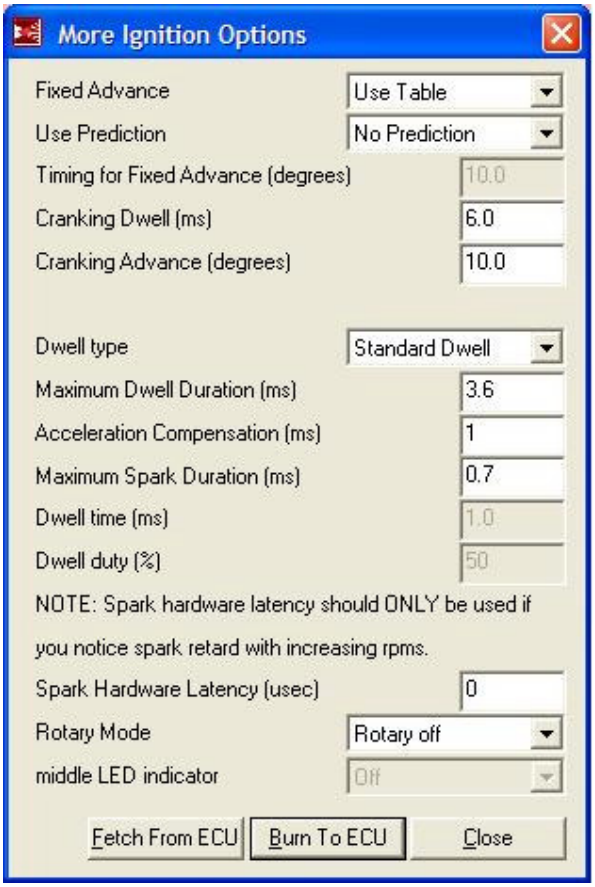
Setting up Dwell

MS1-Extra

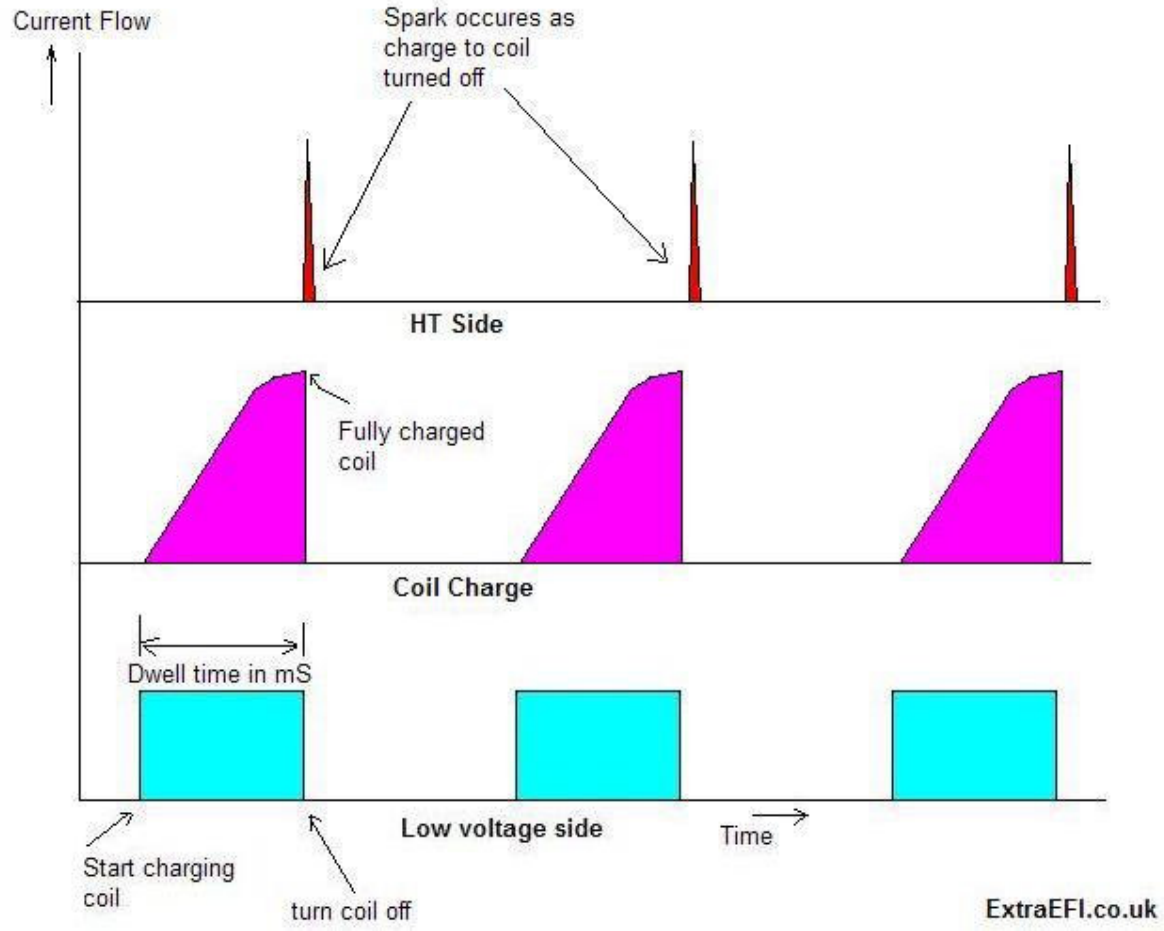


MS2-Extra



First of all we need to understand what dwell is, when engines had points the dwell was simply the angle that the points were fully closed for. There was normally a resistor in line to limit current flow through the coil at low engine speeds, as the time the points were closed would be longer the slower the engine was running. With this in mind, the faster the engine ran the coil would be charged by an ever decreasing time period giving a weaker spark at higher RPMs.

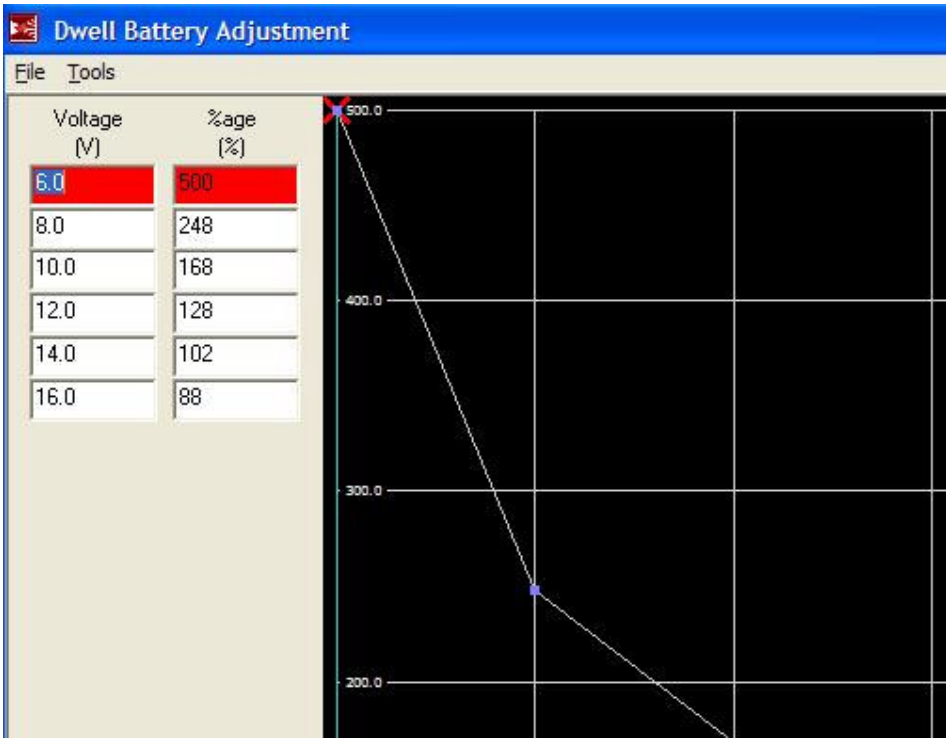
So, dwell is the length of time the ignition coil takes to fully charge ready to make a spark. The spark occures when the coil is switched off after the coil is fully charged. So to look at this on a time line it will be like this:



As can be seen, the coil charges sharply at first then smooths off to its peak. If the dwell (charge time) is on for too long the coil saturates and the driver (VB921 in the MS ECU) will over heat and fail.
Generally settings are between 2.0 and 4.0mS, a Ford Zetec coil pack, for example, is 3.6mS running and 6.0mS cranking. The cranking dwell is usually a lot higher than running dwell. 6.0mS seems to be a very good starting point for this. **Minimum discharge period** ***(MS1-Extra)*** is usually 0.1mS - 0.5mS, I always leave this on 0.1mS and have had no issues. **Acceleration compensation** should usually be set to around 1mS, **Maximum Spark duration** can be set to 0.7mS ***(MS2-Extra Only)***

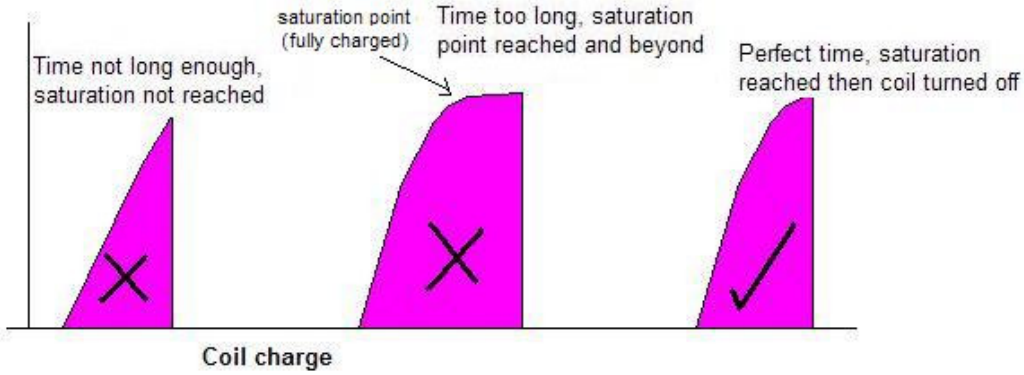
There is another variable to throw into the mix and that is the charge voltage. The lower the voltage available on the coil the longer the charge time needed to reach saturation. In MS1-Extra this is automatically compensated for using basic rules of electronics. But in MS2-Extra you can compensate for the voltage using a table.

Unless you know what you are doing it is best left to its default settings:



So, how do you set it up? Well there are a few ways to do it;

1) If you have an oscilloscope then you simply need to connect a 0.01Ohm 2Watt resistor in location R43, this is usually linked out as its not needed. Then measure the charge voltage on the scope at the top of the resistor. You will see the saturation point (maximum charge reached) where the voltage levels off. Adjust the dwell time so this is as short as possible:



2) Most people will not have the luxury of an oscilloscope, so youll need to use the old fashion method, unless of course you can find the information off the internet. So to set your dwell you need to start around 3.2 - 3.6mS (keep an eye on the temperature of the VB921's and the coil, the VB921's should never get hot, they should remain reasonably cool). Whilst crusing at a lean AFR (14.7) back the dwell timing off untill you feel a miss fire. Then increase the dwell 0.1mS at a time untill there is no miss firing. Then add 0.2mS to this value. The result should be around 2.0 - 4.0mS. If its any different then you could have other issues creating the miss fire.We use lean cruising as this is the hardest condition to ignite and easy to feel a miss fire under.

3) It is also possible to calculate the dwell as long as you know the DC resistance and Inductance of the coil.

(assume t=0, I=0) is:
$T = (-L/R) * \ln(1 - (R * I / E))$
Where:

T = time (seconds)
L = inductance (Henrys)
R = resistance (Ohms)
E = voltage (Volts)
(ln is the 'natural logarithm, often available as 'LN' on calculators)

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