

Crank Sensor and Trigger Wheel Issues

Easimap 6 is not only for mapping, but a usefully diagnostic tool as well and the ECU Status panel can help with fault finding, so if you are have a problem starting an engine and you see 'bad crank tooth pattern' during cranking this is pointing to an issue, **Please note that 'bad crank tooth pattern' will always appear when the engine is first cranked over and when the engine stops running or cranking, this is because the ECU is checking for a complete engine cycle which will not be a complete cycle under these two conditions. Once the engine has been cranking for a few seconds and if the ECU is happy with the tooth pattern the status box will stop displaying this fault, it can then be assumed that the ECU is then happy with the information it is seeing.** If 'bad crank tooth pattern' continues to be displayed during cranking then it could be caused by a number of possible issues, Easimap 6 can only point you in the direction of the fault.

After all the tests have been carried out with the spark plugs removed from the engine and a separate battery as described in the battery voltage section, it means that the ECU is either not seeing a crank signal or not seeing the correct crank signal information. When the engine cranks over, the ECU looks for the information coming from the sensor, the information it expects to see depends on the trigger wheel pattern. When the engine begins revolving, the ECU counts all the teeth once it is happy that the trigger pattern is correct, it will then produce a spark at the correct time. There are several reasons why this may not occur:

- 1) Engine speed is erratic and the ECU is unable to see the teeth correctly. This is normally associated with battery voltage, please refer to the section on battery voltage.
- 2) The sensor or wiring is damaged and therefore the ECU is seeing no information.
- 3) The sensor has some damage and is only transmitting part of the trigger wheel information or the information is being corrupted by external electronic noise, which means the ECU is not happy with the trigger wheel pattern.
- 4) This could be caused by the trigger wheel itself, also the gap would normally need to be 0.5mm to 1.0mm.
- 5) If the crank sensor is wired backwards you would also potentially get the effect you are seeing now. There is a quick change, this I suggest you do after you have carried out all of the above tests. You would need to swap pins 11 and 12 in the ECU hood (9A4 & 9A8 ECU's). This is a really quick change and no special tools are required. Please instructions show on our website.
- 6) Care should always be taken when using a custom trigger wheel, the tip of the sensor should always be smaller than the gap or teeth on the trigger wheel. If the trigger wheel diameter is too small, the amount of ferrous metal passing the sensor may be insufficient at cranking speed for the sensor itself to register a large enough voltage to pass the ECU detection threshold. This needs to be a minimum of 0.6v peak and 1.6v peak to peak. It is also suggested that if you are making your own trigger wheel, that you copy the dimensions of an existing production version, otherwise you will need oscilloscope equipment that is capable of measuring the wave form to ensure the output you are achieving is sufficient, so we would always recommend using a matching a production engine trigger wheel and sensor in order to reduce the possibility of issues.

If you do not feel comfortable with making these tests, you could take the vehicle to one of our recommended mapping agents. Alternatively, we can provide help and support remotely using Team Viewer, one of our engineers could log in remotely provided you have all the mapping hardware and run tests to try to assess your problem.

Please be aware that Technical Support involving our Technicians is chargeable