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Helpful hints if you have trouble getting your engine to run

When installing an ECU and wiring harness for the first time, it is normally quite straightforward with our systems to get them up and running. They are normally pre-programmed by us ready to start your engine, using the information you have provided when ordering your new system.

Before the ECUs and wiring harnesses are dispatched, they all go through rigorous tests. They are tested in manufacture and then when the ECU is programmed, the ECU is also tested to ensure that it is working correctly with the loaded program. All the wiring harnesses are electronically tested after manufacture so once everything arrives with you, they are ready to run.

If problems are encountered, they are normally down to just one or two basic issues so we have created this document to help you.

Although the issues that you may encounter can be overcome without the Easimap software but it is recommended that you purchase the basic mapping hardware and then download the free Easimap software from our website. This will give you access to what the ECU is seeing and allow you to diagnose any reasons why the engine may not be starting much easier.

If you wish to access and change more advanced settings within the ECU, if you either have a map provided new with the ECU or a map from another source, you would need to change the access you have from 'Basic' to 'Advanced Level 1', this done simply be clicking on the bottom right hand side of the screen where the profile is currently shown, you will then be able to select from the list 'Advanced Level 1'. This gives access to all settings within the ECU (there may be other profiles in there which are for MBE use only and are not accessible).

Please read the information supplied with your kit or refer to the website where you will find information associated with installation and wiring.

Possible reasons for not starting

Testing with Easimap software:
It is always recommended to have the basic mapping equipment as you will then be able to see what the ECU is seeing and not have to guess what is going on. Even if you only use the software as a tool to diagnose issues that may arise, simple problems can then be overcome, for example if your engine does not start it could be a problem with the crank sensor or battery voltage. When you install the software and connect it to your MBE ECU with the basic mapping equipment, the basic page which will displayed will show the engine rpm and battery voltage, so when you attempt to crank the engine you will be able to see if engine speed is being seen and battery voltage is sufficiently high enough for the ECU to perform correctly. You should then use the information described above to help diagnose your problems.

If you have problems resolving your issues, then it is recommended firstly that you take your vehicle to one of our recommended dealers as they will be able to diagnose your problem faster or you can contact us and arrange telephone technical support with one of our engineers but this will normally take longer and be a less efficient way of resolving your problems. This can be bought in hour slots, but we only recommend this service if you have gone through all of the below suggestions and have the software and hardware connected to your vehicle.

Battery Voltage

Battery voltage is the most common cause of why an engine will not start, it must be remembered that an ECU is actually a computer much like the one you use at home and if the voltage drops too low, the ECU has difficulty carrying out its instructions. Although you may have a fully charged battery, the wiring connection between the battery, starter motor and ECU are not always ideal and when you begin cranking the engine, the starter motor uses all the available current and momentarily the voltage the ECU is seeing drops below the level that the ECU is able to

carry out its starting instructions. The other possible problem is the battery is actually too small, there is a tendency nowadays for people to use Lithium Ion batteries, we feel that at the moment that the battery technology is still too new and during the initial milliseconds of cranking that this type of battery is less efficient than a lead acid type battery, amplifying the starting problem. You will quite often find that if you were to check the voltage with an electronic voltmeter that the voltage would appear to be ok, this is because your meter is damped and only shows the average of the voltage and not the lowest value seen, which is what the ECU is seeing.

When carrying out these tests or trying to start your engine for the first occasion quite often customers attempt to use a jump battery to boost the power or overcome battery voltage issues. This is not a suitable solution as quite often the jump battery attempts to charge the on-board battery and does not provide sufficient extra power to overcome the issues.

Kill Switch Wiring and why it should never be used as an ignition switch

We have added this additional information because many people do not understand how a kill switch works and what potential damage can occur to electronic equipment fitted to your vehicle and possibly even damaging the ECU.

1. A kill switch should never be used on the earth circuit on any vehicle equipped with modern electronics. Modern electronics are not normally designed to have the negative terminal disconnected and this can damage electronics when this type of kill switch is operated.
2. When using a normal type kill switch that disconnects the 12v feed as a minimum it requires a ballast resistor, that connects the alternator/engine side of the system to ground to dump current from the charging system. There are more advanced systems available but care needs to be taken such a device.
3. Problems that can occur even with correctly fitted kill switches and more advanced kill switch systems. When the kill switch is operated whilst the engine is running, you are effectively disconnecting the alternator from the battery, at this moment in time, the alternator thinks the battery has gone flat and immediately ups its output to try and charge the battery, the higher the rpm the greater the output can be. Under this condition the current has to go somewhere so it picks the easiest route. Even with a simple kill switch with a ballast resistor, there is potential for the kill switch to go open circuit before the ballast resistor is able to dump the current to ground. At this moment in time the current has to go somewhere and picks the easiest route, this could be any electronics which includes the ECU and as described previously, this output could be extremely large and therefore damage if not even destroy the ECU or any other electronics.
4. The MBE ECU has a permanent power supply, which it uses for many features and functions and when the kill switch is first turned on, the ECU goes through a boot up function. Then when the ignition switch is turned on, the ECU cycles through various commands ready for the control features and start the engine. Every time the ignition switch is cycled, it goes through and checks functions, if your vehicle is suffering from low battery voltage, cycling the ECU between attempted starts allows the ECU to reboot various features that may have had issues due to excessively low battery voltage.

NEVER use your kill switch as an ignition switch, only use the ignition switch to engine off and on and only use the kill switch an emergency or when the engine has already been switched off by the ignition and therefore the engine is not running.

Testing without Easimap software:

1) Remove the spark plugs from the engine and reconnect to HT leads or coils resting all the spark plugs on top of one another (ensure that all fuel is turned off) and crank the engine. If sparks are then seen at the spark plugs, this is an indication that the battery supply to the ECU is indeed too low, since removing the spark plugs allows the engine to turn over much easier and therefore the starter motor uses less current.
2) The next test is to then to fit another set of spark plugs to the coils or HT leads leaving the original plugs fitted to the engine, this will then give compression and apply extra load to the starter motor. This is to simulate normal compression loads. Then crank the engine and see if you get any sparks, if you only get a few sparks or one spark and then no further spark or indeed no sparks at all, this proves that the current supply available is insufficient when the starter motor is put under normal cranking load and your wiring needs to be investigated along with your battery size.
3) A good way to confirm that the ECU and wiring harness are performing correctly is to get a second battery, disconnect our wiring harness from the onboard battery and connect it to a separate battery that is not connected to the car, attach the negative and the positive ring terminals. Ensure that you have permanent supply to your fuel pump and if running coil on plug that there is an earth from the engine block to the negative of the second battery. Then crank the engine over carrying out above tests, this way the starter motor is not draining the battery that is providing power to the ECU and wiring harness.
4) Once this test has been carried out, it could be assumed that if still no sparks are seen that it is likely that the crank sensor or trigger wheel are creating an issue. Please refer to information below.

Crank Sensor and Trigger Wheel

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.

Coil Wiring

There is a test output function in the software for testing the ignition drives. If you select each ignition drive in turn, should be ignition drive A and B. (C & D if coil on plug) The ECU will then generate an output for each coil drive which will make the spark plugs produce sparks. This will then prove that you have connected the coil correctly.

Fuel Injector Testing

If your engine does not start, even once you have confirmed your engine produces a spark, it is advisable to check the injectors are working. This can be done by using the injector output test function, which is available on MBE9A* ECUs.

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

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