Ozbush Electronics

Manual Mapper® instruction manual

Model: OBM-2 for Toyota 1KD-FTV Engines

Congratulations on purchasing our Manual Mapper. You are on the way to saving your car from early retirement, fuel cost and most importantly saving the environment.

Installation Procedure for OBM-2

1… Remove the ignition key from the car. You may disconnect negative battery terminal.

2… Locate MAF sensor. It is located on top of the air filter box.

3… Disconnect the MAF sensor plug from its body. Press down the plastic locking tab on the plug, then pull out by holding the plug (Do Not pull by wire).

Please note that MAF sensor body is made out of plastic and very fragile and easy to crack. Be careful when you are pulling the connector out.

4… Connect Manual Mapper to MAF sensor on top of the air filter box by pushing the connector firmly until you feel “click”.

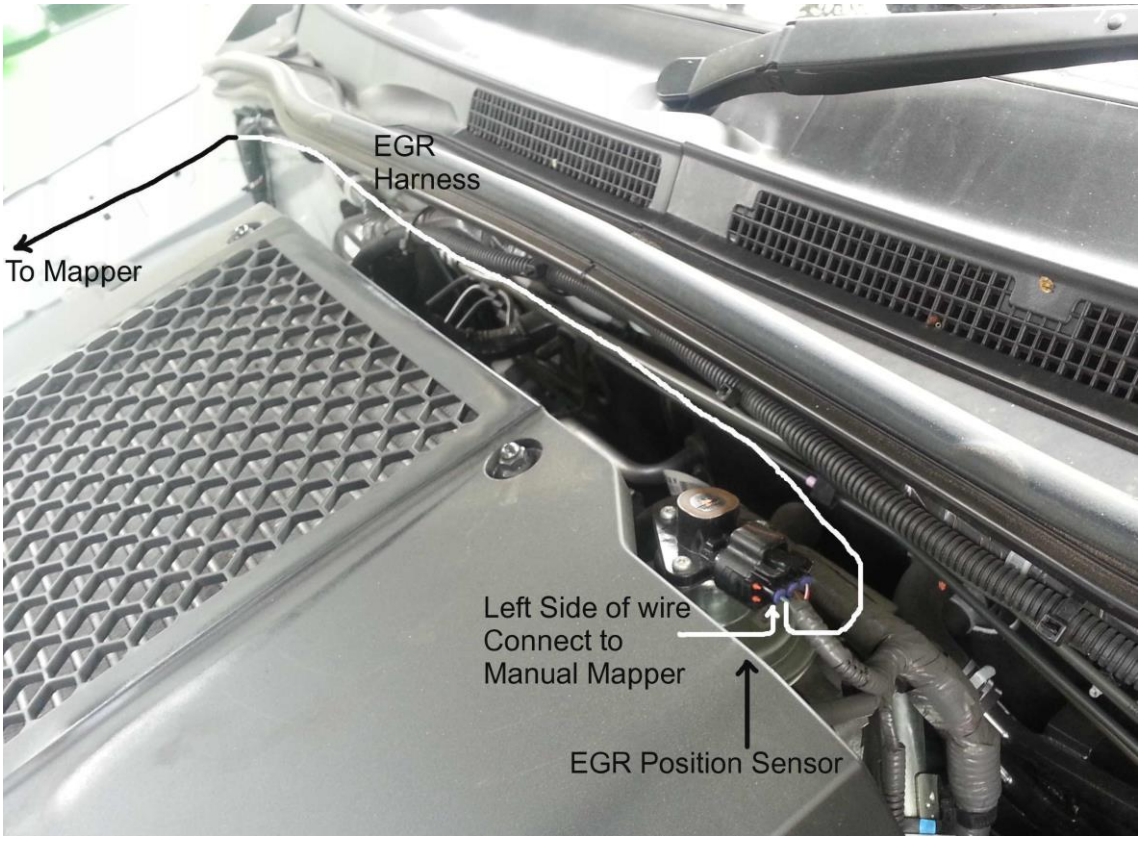
5… Connect Manual Mapper to MAF sensor plug you just pulled out by pushing each other until you feel the click.

6… Fix Manual Mapper body to a suitable location around the air filter box in the engine bay, by using cable ties or permanently

drilling the holes and fix with screws. This is the one area you must use your idea to fix the Manual Mapper body to a suitable location.
The Manual Mapper is designed to withstand up to 10G of shock and vibration so it can move around, but we recommend mounting something solid somewhere in the engine bay where possible for driving corrugated road in the country (Away from heat source too).

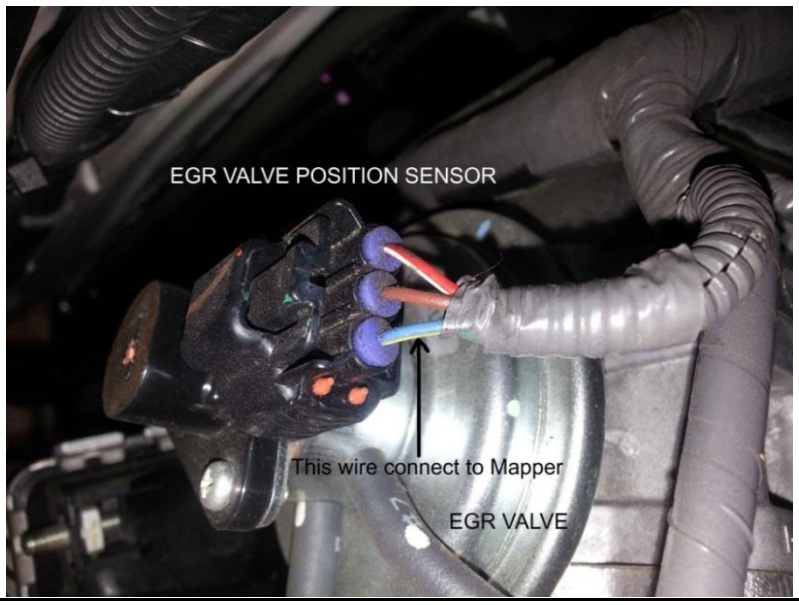
We have been using cable ties to hold Manual Mapper with plastic cable bracket on top of air filter box and other near cable structure for a very long time including fording and corrugations without any problem.

7… Connect EGR harness from EGR position sensor to Green wire terminal in Manual Mapper with a suitable wire. We recommend soldering it directly to back of the EGR sensor connector.



Wiring information for connecting EGR Position sensor signal to Manual Mapper.

Picture of EGR Valve Position Sensor.



Please connect left side of wire (EGR signal) regardless of colour of wire.
Please do not use wire splicer as it cannot make reliable connection and will make trouble near future by corrosion.

You can not damage car computer or Manual Mapper by connecting EGR signal wrongly.

You may just purchase plug and play EGR harness from us if you don't have the time or resources.

Photo of plug and play EGR Harness. Nothing to cut and solder just plug it in.

8… Set Manual Mapper switch to "Mapper On" position and Fuel trim setting to zero.
Reconnect the battery then turn ignition key to on position.
A green light will be turned on the manual mapper immediately if all is connected properly.
Start your engine, the manual mapper light will be changing from green to amber when EGR system is activated. Ask someone to rev the engine to see if the amber light is changing back to green.

That's it! You have done it. You should drive your car around make sure all is fine. (Keep your eyes on the road). If you wish, you can connect Scan Gauge or other suitable instrument to check out whether Manual Mapper is working or not.

You can try the fuel trim setting,
Set to -5% you will find car will go very quietly and smoothly with good fuel economy.
The Car can be very sluggish if set too lean like -15% but it will give you incredible fuel economy.

Set to +5% you will feel the car has more power while it will still give you better fuel economy than without Manual Mapper.
How about setting it +15%? The Car can go a little bit aggressive with more power but it will still give you better fuel economy than before the Manual Mapper install.
You will find your own sweet spot for your preference. Every car is different, even for same brand and same model.
You may set +8 to13% for heavy load driving then you may set an it -8% when you returning with an empty load to save fuel.

The green light on the Manual Mapper will change to orange when car computer activates EGR system, then Manual Mapper will precisely simulate the EGR condition to satisfy its operation criteria.

Note: The most of the parts in the Manual Mapper are military standard components which we tried to use as many as we can. The whole unit is sealed and waterproof.

However, there is one component which we couldn't get our satisfaction for reliability.
It is the switch which we are not yet satisfied. The switch for "Mapper On / Bypass" is not high pressure water cleaning proof. Please be careful when you are cleaning engine bay with high-pressured water gun, don't hit the switch. We will eventually find a mini switch which is high pressure waterproof one day.
If you need to make absolute waterproof then we can send you a rubber boot ($5) to put it over the switch with a dab of silicone.

Otherwise, the unit has been thoroughly tested individually with bush style testing such as cooking oven set at 80c with temperature gauge hanging off and freezer set at -18c while the whole unit is still working.
Sometimes you may receive the Manual Mapper with a little bit distorted label that is because it has been working in the oven 85c and the heat actually melted the vinyl label a little bit but we think it is okay.

For the G test, eccentric shaft and plate by drill turning at 1500 rpm hitting the unit to give corrugation condition with G sensor hanging off. We even pushed up to 15G with no damage to unit, it worked fine.
The aluminium diecast case filled up with epoxy resin and silicon is a real benefit for that.

Therefore, please do not try to open the case you will crack the parts and permanent damage will occur.

Problem solving:

1… No green or red light when Manual Mapper is turned on:
Manual Mapper is not getting the power. It means you have a connection problem. Make sure the connectors are properly connected.

Please note: The most of auto connectors have rubber seals for water proofing, because of these rubber seals, making proper connections can be difficult sometimes. You have to push very hard until you hear or feel the click sound. But, be very careful not to push wrong angles. The connectors or Sensors can be broken very easily.

2… Intermittent operation (Check Engine Light comes on sometimes):
Same problem as above. One of the connectors is not pushed in with click sound and can be loosened up with vibration when you drive.

3… Check Engine Light Stays On after installation:
You did not disconnect battery negative terminal when you are installing the Manual Mapper.
You can reset Check Engine Light by disconnecting the negative battery terminal for 5 minutes (push brake pedal for 30 seconds with battery disconnected to discharge remaining power in the car computer).
Hopefully it will reset otherwise you need Scan Gauge or other Bluetooth dongle device to reset the fault code.
Typical error codes are MAF sensor output high detected or other MAF sensor error messages because you are disconnecting and connecting the MAF sensor circuit while power is still connected to the car computer.

With everything setup ok, your car computer will clear the CEL itself when they learnt all is working fine again. It means you will have to drive your car around normally, then car computer confirms that all is back to normal in more than 4 good starts.

4… Red light is blinking on the Manual Mapper:
Manual Mapper internal diagnostic failure: Manual Mapper has detected faulty components and you need to replace the unit (Manual Mapper is sealed unit and not serviceable, Please return to Ozbush Electronics for failure analysis).

5… Check Engine Light is turned on with error message P0401 “Insufficient EGR gas flow detected” or P0406 open wire in the EGR position sensor:
Possibility of plug and play connector is loose and not fully engaged in the EGR valve position sensor.
It could be actual EGR Valve or position sensor failure condition too.
Note: Please make sure your car EGR system is fully functional before you install Manual Mapper. Some people forgot that they disabled EGR valve by inserting ball bearing in the EGR valve hose.

6… P0402 EGR gas flow excessive error message or P0101 MAF Range and Performance Error message when you set fuel trim below -10%:
This is a rare condition, but is caused by mostly sticking EGR valve or worn MAF sensor when you installed Manual Mapper due to Manual Mapper is now using wider areas of the EGR position sensor therefore the EGR valve has to travel further than normally would and new area that they use is very stiff and causes occasional momentary sticking of the EGR valve, then the car computer will see as fully open and not responding so they put up error message P0402 or P0101.

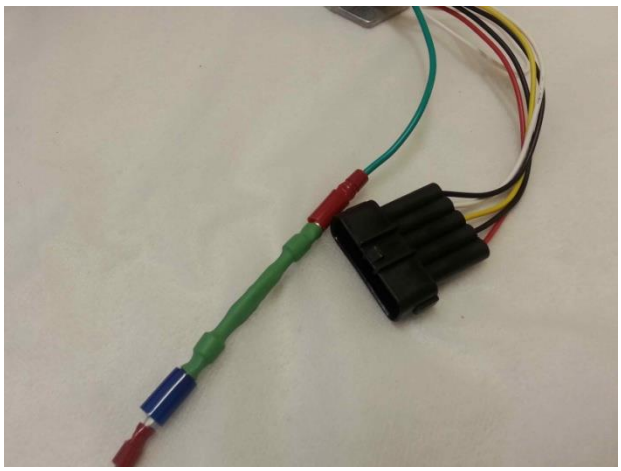
7… P1251 error code:

Sometimes for some customers (one out of 150) the car computer will give P1251 error code in extreme condition when both sensors, MAF and MAP pressure difference is too much (while the EGR valve or the turbo Vane lever is sticking). This condition is only exists in the electronic signal problem, not a real air pressure problem, but car computer will put you into limp mode, therefore, I strongly suggest you to fix it quickly. Please do not use the Mapper until you have solved the problem.

Early Manual Mapper has not anticipated above condition for some old cars, please contact us and get a little patch device which will halve the EGR position signal to compensate that error. You do not need to replace expensive EGR valve.

Even for the later updated software version of Manual Mappers still can't tolerate some severely worn out but still functioning EGR valve, we recommend that you try out patches before you do anything else.

EGR signal patch for worn out EGR Valve.



Otherwise, just simply set fuel trim always from -10% to +10% range. Don't set fuel trim below -10%, then you will not have the problem.

Do it yourself EGR harness: The automotive connectors are very expensive items.

Information for if you wish to make your own EGR harness.

Connect one wire from Manual Mapper (Green wire) to the EGR valve position sensor.

The colour of wire is not important as Hilux and Prado uses different colour of wires.

It is the left side of the wire when you look at the back of the EGR position sensor connector.

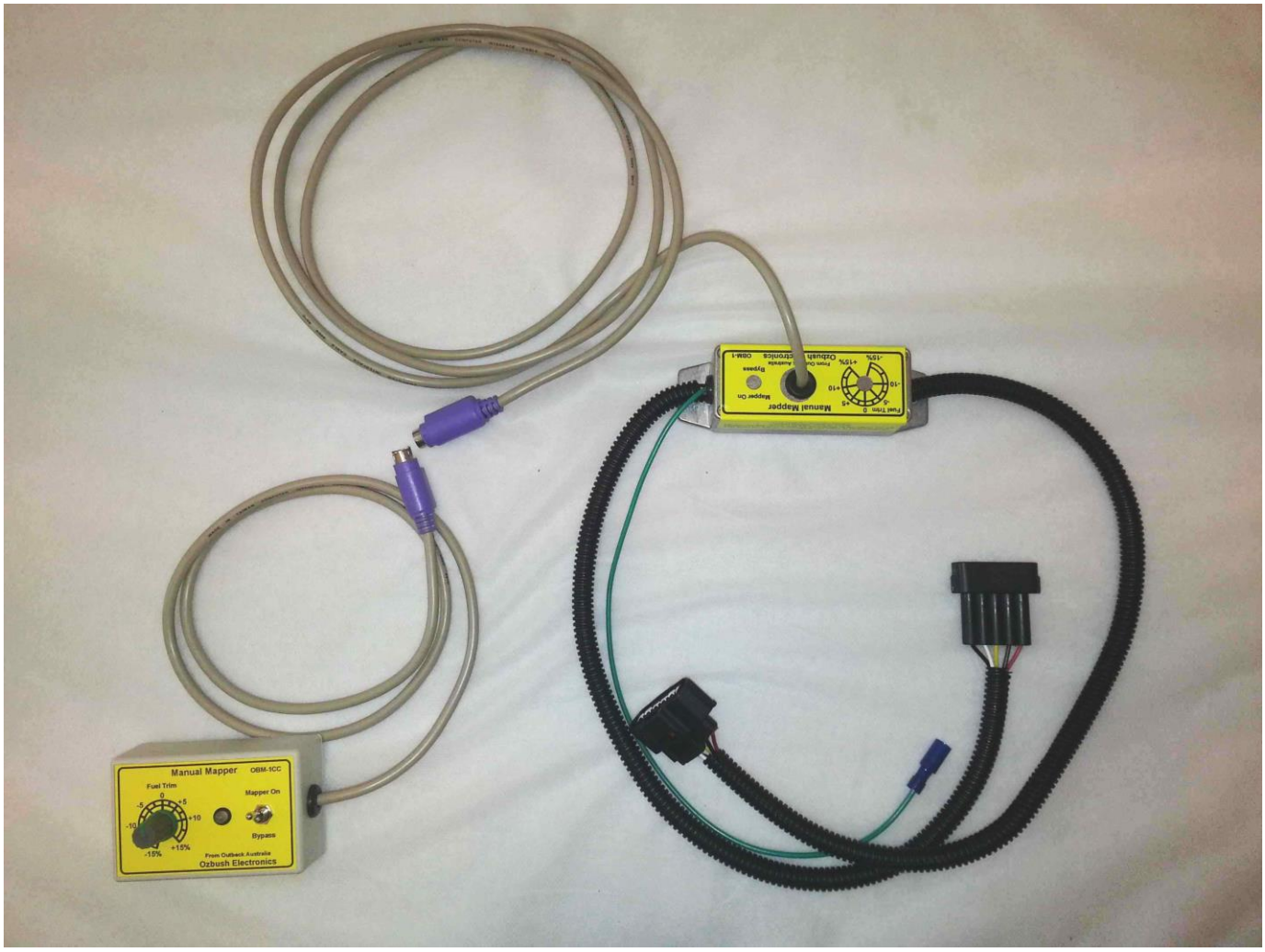
You need to peel off the insulation on the wire and solder a wire directly.

Due to unreliable connection problems wire splicer is not recommended.

Please use plastic conduit to protect the wire.

For Old Hilux up to 2006 has slightly different EGR connector which has a notch in the middle, in this case the EGR signal is middle wire. (3 pins: 5V Ref Volt, EGR signal and Ground)

For **OBM-2CC**, In cabin control Manual Mapper:



Please use Velcro stat provided to mount inside of the cabin where you can see and reach easily to control fuel trim.
The cable connecting between in cabin module and Manual Mapper under the bonnet is a very fragile, thin copper wires, therefore, not to be stretched too hard when you install.

Don't forget to use a bit of silicone to seal it up after passing the cable through.
The connector between in cabin module and Mapper is also a very fragile computer connector. Please be careful when you connect it. Just aim and align the connection by flat surface to a flat surface on both connectors.

The OBM-2CC Manual Mapper main body which installed in the engine bay is fully IP67 proofed which means it can stay under the water extensive time and also safe against water spray gun.

The effect of full blanking plate:

The blanking plate will increase the engine power around 10-18kw in cruising. But many people cannot feel the increase of the power and kept the pedal in the same position. The end result is increased fuel consumption. Therefore, it is recommended to set Mapper dial from -5% to 8% to compensate the effect. Every engine is different, you need to experiment with your engine.

Emergency Fix:

The Manual Mapper is designed and manufactured according to military specification up to 90%. However, any electronics equipment can fail, no matter how well designed, we even had a customer calling near desert asking for help because he accidentally smashed the switch in the Mapper unit with his spanner while he was fixing additional fuel filter.

So here are some suggestions for you if you have a problem.

1… If you suspect Mapper has a problem then all you have to do is simply throw the power switch to "BYPASS". In this position, the Mapper is out of the circuit all together and the problem should go away if there was a problem with Mapper. The associated error codes are P0101 or P0401.

2… If you still not sure then you can disconnect the Mapper physically and restored to the original connection, which only takes 1 minute.

3… The error code P0400 will come up with check engine light, even if you removed the Mapper because you still have the blanking plate installed, but this **does not put the car into limp mode**. **You can still drive the car with full power as long as you like.** (I know many people drive like this to save the engine from soot problem.)

However, if you get P0101 error, then you have a faulty MAF sensor, the Mapper don't have a problem. Because we deal with MAF sensor always, we found a surprising number of people have a MAF sensor problem regardless of the Mapper. Reminds you they do fail.

So if you have a Manual Mapper problem, then all you have to do is to set the switch to bypass or physically disconnect it. You can still drive with error code P0401 (due to blanking plate). You do not need to remove the blanking plate. However, you will not know if there would be another problem cropping up because the check engine light is already on. Check the engine status with Scantool always to see if any other error codes are generated.

You can still drive in limp mode even if you have a faulty MAF sensor (P0101 error code) to reach the nearest town to order the new MAF sensor. However, I strongly recommend you not to reconnect the Mapper with new MAF sensor until you checked out the Mapper hasn't been damaged too.

It was rare, but we found two times the faulty MAF sensor damaged the Mapper and then the damaged Mapper will now burn out new MAF sensor when you replaced. The micro fuse has been inserted in the Mapper to protect new MAF sensor since Oct 2017.

Emergency Field Master Reset for the car computer:

To clear the check engine light and the error codes without Scantool.

The scantool will clear any codes, but in case if you don't own the scantools then this is a way to clear the error code and works most of the time.

1… Disconnect the Negative battery terminal to disconnect the power to the car computer.

2… Push on the brake pedal for two minutes to discharge any remaining charged power in the car wirings and devices.

3… Reconnect the battery terminal.

This action should clear, the most of the codes but if you can't then you are most likely to have a serious problem which turns on the check engine light straight away.

Disclaimer notice:

Please take ample awareness about the Manual Mapper usage, we take as much research as possible to prevent any mishaps but **the ultimate responsibility is on you**. Please look after yourself and your car at best.

Do not be distracted by your devices in the cabin. Look out on the road!

We may not refund the unit in case of you have changed your mind because once you have installed the Mapper unit, then it is no longer re-saleable due to mechanical markings. The unit is resin sealed and can not be re-manufactured.

Please always in communication with us for any difficulties or questions, we are not responsible for your action and consequent damages or costs.

Please don't hesitate to send any inquiries to ozbush@hotmail.com. We will try best to answer all we can.

Thank you

Accept who you are and what you have and live with it.
Giving up or surrender is not a failure, you are only wiser.

Ozbush Electronics

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