Ozbush Electronics

Manual Mapper® instruction manual

Model: OBM-1 for Ford PJ/PK Ranger and Mazda BT-50 (B3000) 2006-2011
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-1 Standard Mode 1 option.

Please note: The mode 1 is not a viable option anymore due to the manufacturer is updating the car computer software to disable the mode 1 when you are in dealer service. The temperature cheating method (mode 1) is no longer recommended. In any case please use mode 2 with EGR harness.

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 a 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 using cable ties or Velcro-stat provided. This is the one area you must use your idea to fix the Manual Mapper body to a suitable location. You may use some angle bracket to fix the Manual Mapper to the air box body. 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).
Please refer to the photos below
We have been using cable ties to hold Manual Mapper with a plastic cable bracket on top of the air filter box and other near cable structure for a very long time including fording and corrugations without any problem.

7… Set Manual Mapper switch to "Mapper On" position and Fuel trim setting to zero, then re-connect the battery and start the engine.
A green light will be turned on if all is connected properly.

That's it! You have done it. You should drive your car around make sure all is fine. (Keep your eyes on the road).
Don't worry about a green wire from Manual Mapper, it is for Mode 2 option and you don't need it.
If you wish, you can connect Scan Gauge or other suitable instrument to check out whether Manual Mapper is working or not.
If you have Scan Gauge it will show MAF intake air temperature is around 7-8c regardless of actual ambient temperature. In this way, car, computer will not activate the EGR system at below 10c.
Don't confuse with turbo boost sensor (MAP) intake air temperature reading. That would be higher than ambient temperature.

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 very aggressive with a lot of power, but it will still give you better fuel economy than before 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 it -8% when you returning with an empty load to save fuel.

Please Note: This ambient temperature cheating method is most prevalent in the market to stop EGR system, but it will overburden the fuel pump, injectors and fuel heater is turned on, also it can over charge battery.

Cable Ties are holding the Manual Mapper on this photo;

You can drill holes and use screws or glue it like this photo

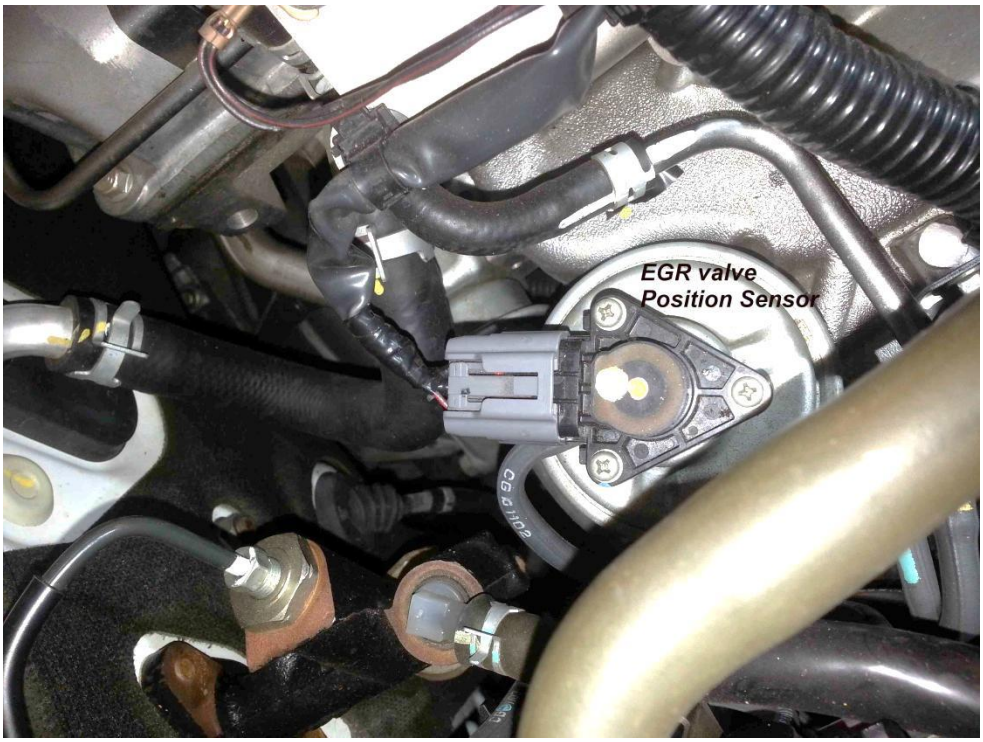
Mode 2 option… EGR Valve Position Sensor wiring (A Green wire from Manual Mapper).

There are some car computer will activate the EGR system at any temperature randomly regardless of ambient temperature. As far as I concern, these are faulty computers, which they fitted from new. And also many diesel professionals would like to use this Mode of operation rather than temperature auto tracking mode 1.

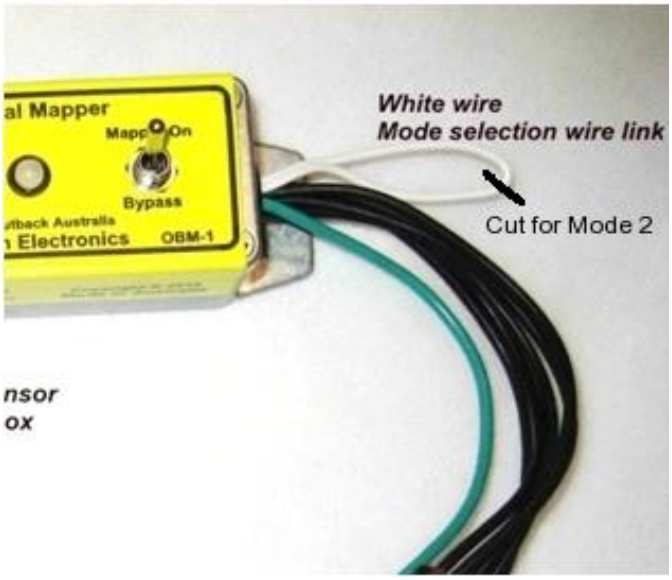
You need to get EGR position sensor connection harness from us if you like or if you are okay with car wiring around then you can just connect this green wire to **Blue/Black** wire at EGR valve position sensor connector.

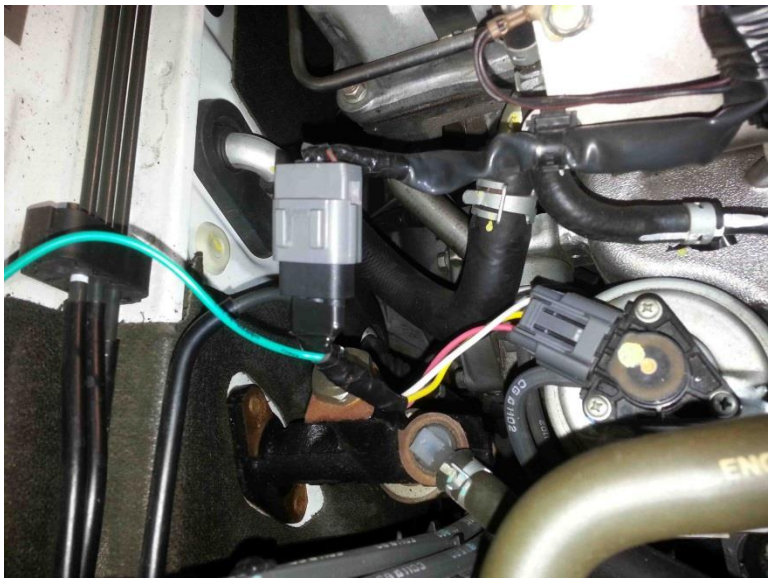
If you don't like manually connecting the wire, then get an EGR position sensor harness from us which has complete plug and play system. Just a piggy back plug it, that's all.

Picture of EGR Valve Position Sensor on the driver's side.



To activate the EGR feedback system mode 2 in the Manual Mapper, you must cut white wire link (loop) in the manual mapper (Refer to Manual Mapper photo). Then use some electrical insulation tape to wrap up the white wire that you just cut to make sure the copper section would not touch anything. You may also cut it off right at the rubber grommet.





Pictures of plug and play EGR Harness. Nothing to cut and join just plug it.

The Green wire from EGR valve must be connected to Manual Mapper

The green light on the Manual Mapper will change to orange when car computer activates EGR system, then Manual Mapper will precisely emulate 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 with it. We will eventually find a mini switch which is high pressure water proof 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 silicon.

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 with 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 the unit, it worked fine.
The aluminium Diecast case filled up with epoxy resin and silicon is a real benefit to that.

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

Problem solving: Please see **"Emergency Fix"** at the end of the Manual.

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, then hold down the brake pedal for 1 minutes then re-connect the battery. 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.

In mode 2 operation, 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.

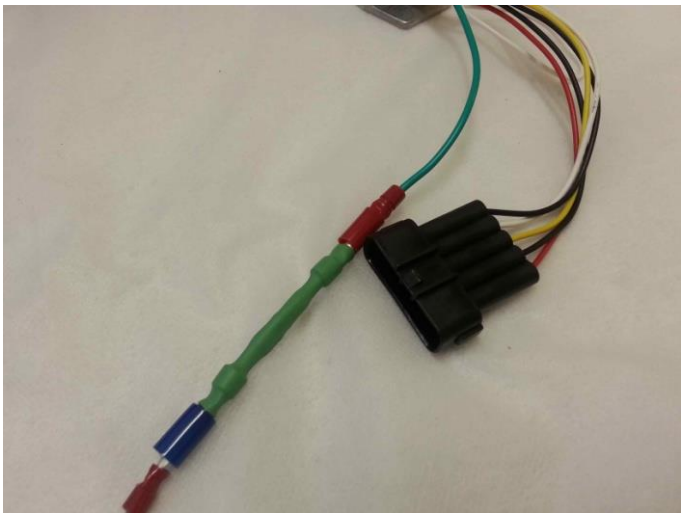
Faulty Manual Mapper is also a possibility; you can confirm it by looking at Scan Gauge. MAF Intake air temperature must be 9c or below in mode 1. Must not be 10c or higher. Please do not confuse with MAP sensor temperature. This is for Mode 1 style operation that is an auto temperature tracking mode to turn off the EGR system.

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… In Mode 2 Operation: 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.

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.

Note: In **Mode 1 operation** (Auto temperature tracking with white wire not cut and no green wire connection) without EGR blanking plate:
This is a very simple mode of operation which is ideal for switching between off-road and the public road with Mapper Bypass switch.
The diesel engine will work so quietly and smoothly with EGR shutdown with fixed intake temperature.
Of course you will have to set your own fuel delivery trim. Try this mode, you will love it.

However, it will work just as well with blanking plate in place. But check engine light will be turned on when you throw the mapper switch to bypass because the car computer will see no EGR gas flow.
Please note: If your car engine is running very rough on idle and lacking the power or comes on fault code, then your engine can not be run in mode 1, please go to mode 2 operation.

In **Mode 2 operation** (EGR simulation mode, white wire cut and green wire is connected to the EGR valve position sensor with plug and play harness):
Auto temperature tracking is not enabled. This mode is designed for some car computers will turn on the EGR system at any temperature randomly and also preferred by diesel professionals.
You may miss out the smoothness of mode 1 style operation, but it is good for rough off-road and racing.
It will simulate EGR condition precisely by increasing and decreasing the MAF output according to car computer EGR operation criteria. However, fuel trim in Manual Mapper will still function precisely as intended. You will still get reasonable fuel economy, according to dial settings.

For Petrol Engine users: I have not seen yet, but I have been warned that reducing fuel mix to too lean could cause the exhaust valve to burn out. So please take ample caution not to reduce too lean.
However, there is no such problem in diesel engines. You can adjust your fuel delivery as lean as you can.
Because, diesel engine operation range is based on lean burning range. From idle to full power is only controlled by a fuel delivery in principle (albeit turbo is making the whole thing like a petrol engine).

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 blue / black on EGR position sensor connector.
You need to peel off the insulation on the wire and solder it directly. Due to unreliable connection problems wire splicer is not recommended. Please use plastic conduit to protect the wire.

For **OBM-1CC**, 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 wire, therefore, not to be stretched too hard when you install.
Instead of drilling a new hole, try to use a large rubber grommet where two air conditioning pipes enter the cabin.
You can make a hole in the rubber grommet just under the pipes and pass the Manual Mapper control cable into the cabin. Do this drilling or + slit cutting from inside of the cabin.
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-1CC 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.
You can operate OBM-1CC under two modes of operations as described in this manual.

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. We have been helping stranded people unrelated our product too.

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 that you do not reconnect the Mapper with new MAF sensor until you checked out the Mapper hasn't been damaged too. (please call us if you are not sure).

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.

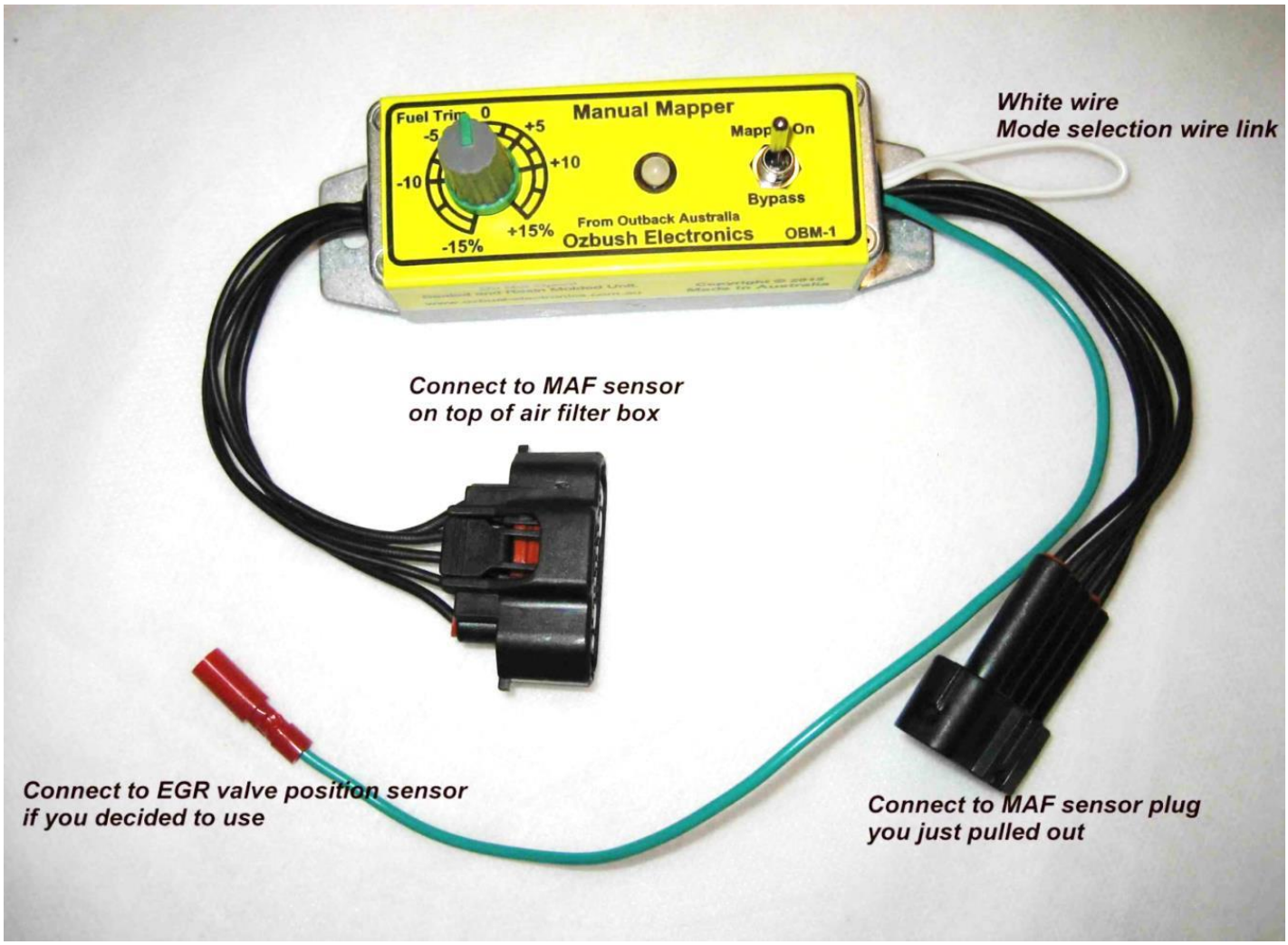
Do not be distracted by your devices in the cabin. Look out on the road!

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.



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

Emergency contact mobile phone number 0425 221 412 (Int: 61-425-221412)
Ozbush Electronics. Email: ozbush@hotmail.com

OBM-1 Instruction Manual Version 5, November 2018