

Gore Research Fuel Processor **MODEL IMP6** (to suit both LPG and CNG Fuels)

For fitment to AMERICAN STYLE CONVERTORS (ie simple convertors with complex mixers)
ie To suit Impco, OHG, Nolf and LG Motor Gas "B" Series Vapourisors

Thankyou for purchasing the latest Fuel Processing equipment from Gore Research. Electronic Fuel Processors are now required in most industrialised countries to reduce tail pipe emission levels. This is good news for the vehicle owner as gas consumption is reduced significantly. When an electronic fuel processor is installed, the fuel economy of an engine is generally improved by approximately 7% to 10% for city driving and 30% to 35% for country driving under light loads. This ensures that the cost of a fuel processor is quickly paid for by consuming less fuel to cover the same distance.

To install this fuel processor, the vehicle must already have an oxygen sensor in the exhaust pipe. Several IMP6 models are available for different O2 output voltages (see the label on the bottom plastic case of the IMP6).

A TPS (throttle position sensor) input is also required for fast performance whilst accelerating. If a standard TPS sensor (idle = 0.2 to 1.6 volts, full throttle = 2.8 to 7.8 volts) is not present on the vehicles throttle body, further interfaces must be fitted. The RTPS interface is to be installed when the vehicle is fitted with a reverse TPS sensor (ie one that gives a higher voltage at idle and a lower voltage at full throttle). The NTPS interface is to be installed when the vehicle has no TPS sensor fitted. Please note that the acceleration response may be delayed when a NTPS or RTPS interface is used.

The installer can choose to run the vehicle in either open or closed loop at idle (TPS sensor present). The Processor has built-in rich and lean tuning lights to help the installer tune the vehicle.

The Processor incorporates an electric vacuum solenoid (hereafter referred to as the poppet valve, part number PV1). The PV1 is controlled by the IMP6 electronics to vary the amount of vacuum being applied to the convertor's diaphragm. This in turn varies the convertor's operating pressure which then controls the fuel mixtures entering the engine.

WIRING CONNECTIONS (a wiring diagram can be located on the final page of these instructions)

Always install the IMP6 inside the vehicle above the driver's feet. The unit is not waterproof and should not be installed under the bonnet. The IMP6 comes with a 2.5m seven-conductor loom, with snap on connector. The loom contains the following wire colours.

RED wire

This should be connected to the +12 volt side of the gas switch (or the wire that drives the gas valves if an automatic changeover switch is fitted), so that it is only powered up when the driver wishes to run the vehicle on gas. **The power supplying the gas/petrol switch should come from a 'clean' source (ie the ignition switch) NEVER from the positive side of the coil.** The red wire (which supplies power to operate the processor) should be fused with a 2 amp fuse to comply with AS and EU automotive safety requirements.

BLACK wire

This should be either connected to the OEM computer earth (preferable) or to the engine earth. **The vehicle chassis (ie firewall, fenders etc) must not be used as the IMP6 must be referenced correctly to the oxygen sensor.** The earth point should be away from the high-tension leads, the distributor and the alternator as these radiate large amounts of electrical noise (which can cause electronic devices to malfunction).

BROWN wire and GREY wire

Locate the signal output wire from the Oxygen (O2) Sensor. Vehicles usually run the following wiring to their oxygen sensors:

A/ *Single wire* - This wire is the signal output wire (which is sometimes shielded).

B/ **Two wire** - One wire is the signal output wire (which is sometimes shielded) and the other is the reference earth wire for the sensor. Occasionally you will find that one wire is the signal output wire and the other wire supplies +12 volts to the heater winding. In this case the sensor uses its metal body as the earth of the heater winding.

C/ **Three wire** - The first wire is the signal output wire (which is sometimes shielded), the second is the +12 volt heater wire and the third wire is the earth for the heater winding. Note that sometimes the third wire is the oxygen sensor earth wire instead of the heater winding earth.

D/ **Four Wire** - The first wire is the signal output wire (which is sometimes shielded), the second is the +12 volt heater wire, the third wire is the oxygen sensor earth wire and the fourth wire is the heater earth wire.

Always look for the shielded wire as this normally always surrounds the output signal wire. Sometimes this shielded wire only begins after the plug connector which is often found within 30cm of the oxygen sensor. If you have difficulty in determining the O2 output sensor wire please refer to the vehicle manufacturer's wiring manual.

Carefully cut the O2 sensor wire leaving the shield wire (if present) uncut. Ensure the shield wire (if present) is not shorted to the signal output wire.

The BROWN wire is connected to the cut wire that leads to the Oxygen Sensor. The Grey wire is connected to the cut wire that leads to the vehicles ECM (computer) O2 input.

GREEN wire

This should be connected to the Throttle Position **Sensor** output (note NOT the throttle **switch**). This sensor should, with the throttle at idle, read approx 0.2 to 1.6 volts. When the throttle is depressed the voltage should slowly increase to around 2.8 to 7.8 volts at full throttle.

BLUE wire

This should be connected to one side of the poppet valve PV1 (either side).

YELLOW wire

This should be connected to the other side of the poppet valve PV1.

OPERATION

In the front lens you should observe four lights.

RED LIGHT

The Processor contains a potentiometer on the RHS (looking from the front). Rotate this slowly clockwise (with the vehicle idling on gas) until the **red light JUST comes on fully** if you wish to operate the vehicle in **open loop mode at idle**. This will then prevent the PV1 from operating at idle. This will reduce the likelihood of backfire on hard acceleration from idle and will increase the vehicles performance when accelerating from idle. The engine may idle more smoothly when operating in open loop mode. The red light should **always** be adjusted so that it is **fully on** or **fully off** at idle. It should not flicker at idle or at revs.

GREEN LIGHT

With the vehicle idling on LPG/CNG depress the accelerator quickly. If you have connected the TPS sensor correctly the green light should operate. This indicates an increasing load condition to the Processor. The Processor will now stop the PV1 poppet valve from opening, thereby allowing a richer mixture to be delivered to the engine. This will increase the acceleration performance of the vehicle. The green light will stay on for varying times depending on how fast and how far the throttle is depressed. The green light should go off completely (and not flicker) when the throttle is held steady.

LEFT ORANGE LIGHT

The left orange light is lit when the engine is running LEAN (ie not enough gas).

RIGHT ORANGE LIGHT

The right orange light is lit when the engine is running RICH (ie too much gas).

POPPET VALVE (PV1) INSTALLATION

To reduce operating noise, the PV1 should be affixed with the supplied cable ties to an under bonnet rubber hose in such a way as to not cause damage to the hose due to vibration over a period of time. **Always install the PV1 poppet valve as close as possible to the convertor** as this reduces lag under heavy acceleration. Always, for the same reasons keep the **vacuum hose** (not supplied) **from the convertor to the PV1 poppet valve as short as possible**. The PV1 is supplied with an air filter sponge already affixed. This simply stops airborne contaminants from building up on the atmospheric side of the convertor's diaphragm.

The PV1 poppet valve should be connected between the mixer's vacuum port (if one is not present next to the air/gas valve, one must be drilled and tapped) and the convertor's atmospheric diaphragm port (see drawing). Please note that **VACUUM MUST NOT BE GAINED FROM ANY OTHER SOURCE** (ie NOT from the vehicles vacuum port or from the clean air port before the mixer). Use the supplied right angle screw fitting to connect the vacuum line to the convertor. This fitting has a 1.9mm hole drilled in it to eliminate flat spots on hard acceleration.

TUNING THE GORE RESEARCH FUEL PROCESSOR (IMP6)

PLEASE FOLLOW THESE EASY TUNING INSTRUCTIONS TO ENSURE MAXIMUM ECONOMY IS ACHIEVED

1/ The LPG/CNG installation should be complete with the poppet valve (PV1) and associated vacuum hose fully installed. Do not connect the two wires at this time to the PV1. Make sure that the wires do not contact each other or make contact with the chassis while being disconnected.

2/ Always check that the engine of the vehicle is in good tune and running well on petrol BEFORE attempting to operate the engine on LPG/CNG. Pay particular notice to the condition of the electrical system and also ensure that no vacuum or air leaks are present.

3/ Now start the vehicle and changeover to run on gas. The vehicle may need to be restarted several times to get the new fuel up to the engine.

4/ Allow the engine to run on gas for several minutes to allow the oxygen sensor to warm up.

5/ With the vehicle idling, adjust the idle screw on the mixer until the IMP6 Processor RICH light **just** comes on (ie screw clockwise). If you are unable to richen the idle mixture you may need to change the mixers diaphragm. Speak to your mixer supplier regarding further information on this.

6/ The power valve on the mixer can often be adjusted and left in the central (middle) position if a "feedback" diaphragm is installed. However for more accurate tuning (and increased economy), particularly if a "clean air" diaphragm is installed, the following procedure should be carried out. **This procedure can only be done while the vehicle is under heavy load and at wide-open throttle (WOT). It cannot be adjusted by simply revving a stationary vehicle.** The mixer power valve should be adjusted by finding a medium hill (or being loaded up on the dyno). Accelerate hard up the hill and have a passenger (for safety reasons) observe the rich/lean lights on the processor. If under hard acceleration from 1500rpm to approx 4000rpm the lean light stays on all the time, richen the power valve setting on the mixer. If the vehicle runs rich all of the time, lean the power valve setting on the mixer. Perform the WOT tests several times until the vehicle runs **just rich** over the entire 1500 to 4000 RPM rev range. If you are unable to richen the mixture under heavy load you may need to change the mixers diaphragm. Speak to your mixer supplier regarding further information on this.

7/ Now reconnect the two wires to the PV1. Adjust the potentiometer on the RHS (looking from the front) of the Processor for open or closed loop operation at idle (refer to the "RED LIGHT" section as described on a previous page). If the Red Light is **on at idle** the vehicle should be running **just rich at idle**. If the red light is

off at idle the rich and lean lights should be **toggling back and forth at idle**. When accelerating, the green 'Accel' light should come on (forcing the vehicle to run rich for some 3 to 15 seconds). Some 5 to 10 seconds after the red and green lights turn off, the rich and lean lights should toggle back and forth. This indicates that the engine is operating in the lambda range.

This completes the tuning procedure.

NOTES: LPG contains only 26 Megajoules of energy per litre compared to that of 32 Megajoules for Unleaded Petrol. This is a 19% reduction in energy, which can only be made up if the vehicle is tuned to run richer. This in turn will reduce the economy achieved by the customer.

The IMP6 comes with a three-year warranty, which covers parts and labour (excluding installer abuse). In the unlikely event that an IMP6 fails, it may be returned from year four through to year ten, for a set, competitive repair cost. Gore Research reserve the right to either repair or to replace the unit at our discretion. The warranty on the poppet valve is limited to 12 months from installation to the vehicle.

The IMP6 has been tested to ensure compliance with current EMC/CE regulations for Australia and Europe and ER67 Annexes for the EU. (C) GORE RESEARCH 07/2001.



