

APOLLOGAS IS CURRENTLY DEVELOPING WITH LANDIRENZO A DIRECT INJECTION SYSTEM FOR THE HOLDEN VE 3.0L AND 3.6LITRE SIDI.



Contrary to incorrect statements penned in various forums recently concerning the so called benefits of liquid injection systems, Vapour Injection Systems work perfectly with direct (and port fuelled) injection engines. In fact the Vapour Injection System has many advantages which make it more beneficial and commercially viable to the market. It doesn't require any modification to the OEM fuel delivering line.

A proper controller calibrated for LPG

manages the gas mixture with enhanced strategy to control gas pressure and temperature. Proper strategies are provided to preserve the petrol injection and pump functionality, at regular intervals of time a single cylinder is switched to petrol for some firing (split fuel strategy). The petrol consumption is not noticeable by the driver.

Emission levels are much better since the port injection provides a better fuel homogenization (mixing with air)



Liquid and Direct Injection!

In a liquid injection system for direct injection engine the LPG is injected by the OEM high pressure pump and petrol injector. So no gas injectors are present. All the fuel mixture is controlled by the OEM petrol ECU, which is calibrated for a different fuel (petrol) much different from LPG; this will result in some issues related with shift of self adaptative and cold starting of the engine. (stoichiometric value of the 2 fuels are different as we calculate the density of the fuel) this gives problems in standard port injection engine, but in direct injection is even worse since they cannot control it with the size of the nozzles. The system requires huge modification to the OEM petrol delivering line and is not capable of on time fuel switches since during change over the 2 fuels mixes. It requires modification to the high pressure fuel pump, since a return line (not provided generally in these engines) has to be added!



Failures of the pump have been experienced without this modification in all engines by the VW group. Oil contamination of the fuel could damage the fuel delivering line.



The gap of performance with equivalent vapour injection system are little and cannot be noticed by the driver.

The direct injection gives huge issue concerning the pollution formation and after treatments, much worse than in port fuel injection engine, mainly because of bad homogenization (mixing) of the fuel. To improve this is a huge job of tuning of the combustion chamber and of the air/fuel guide is needed (spray and air guide). This is tuned for petrol not for LPG and with LPG emission levels will increase, mainly for the particulate or soot! Not regulated yet but with E6 requirements soon will be.

NEW: LANDIRENZO OMEGAS PLUS SELF-CALIBRATING DIRECT FUEL INJECTION KIT



Direct fuel injection systems for gasoline Motors are an innovative solution to The problem of fuel consumption and Performance. In recent years we have Seen an increase in the number of Vehicles offered by major world Automobile manufacturers with direct fuel injection engines. Landi Renzo has looked into LPG conversion of engines of this type, so that owners of GDI vehicles can benefit from the advantages of natural gas.

The system makes use of "Landi Renzo OMEGAS PLUS" multipoint sequential injection technology, only recently introduced but already thoroughly proven successful in use with conventional engines. The system has been integrated with a sophisticated dedicated engine control software to guarantee compliance with optimal operating parameters for gasoline powered engines while at the same time permitting optimisation of performance when running on gas by special management of injection methods.

This allows drivers to enjoy both the features of power, driving pleasure, reduction of consumption and polluting emissions of a direct fuel injection engine as well as all the benefits of LPG : reduction of pollutants above all (-10% carbon dioxide, -20% uncombusted hydro-carbons, -35% carbon monoxide, no particulate emissions). LPG powered vehicles enjoy freedom to

travel even on no-traffic days.

And then there are the savings: a litre of LPG now costs 52% less than a litre of gasoline and 47% less than a litre of diesel.

The benefits of LPG have finally been combined with those of direct fuel injection to offer the public an attractive new option. Landi Renzo has also perfected a new fully self-calibrating kit, Omegas Plus, to reduce tuning-up times and guarantee driveability, performance and compliance with emissions limits, as it is based on estimation of a physical model of the engine.

The new kit offers several new features: it is compatible with R/115 standards; it permits transition from one type of injector to another, recalibrating only the injector feature; it has an automatic mapping feature requiring only minimal PC use during installation; and it can update calibration via Internet.

LANDI RENZO HAS BEGUN BUILDING A NEW RESEARCH AND DEVELOPMENT CENTRE

In recent years the automotive industry has seen a progressive increase in the severity of restrictions, resulting in increased use of complex, technologically advanced solutions. Engines have been revolutionised by the introduction of Euro IV and EOBD (European On Board Diagnostic) regulations.

In the years to come the trend will be confirmed by introduction of Euro V and Euro VI standards, currently under discussion in the European Parliament, and by technological innovations such

as Direct Injection, hybrid vehicles, engines that run on alternative fuels and hydrogen. In this context Landi Renzo - even though it already has a cutting-edge technical facility for development of LPG and CNG fuel systems - is preparing for the future with construction of a brand new technical facility. The centre will be built near the company's headquarters in Cavriago, and will include: -a components testing area permitting testing of various components with LPG, natural gas and

hydrogen - a vehicle and engine testing area composed of 4 dynamic engine test benches, 2 roll benches for emissions tests and a climate cell.



LANDIRENZO®

