

DUAL FUEL OVERVIEW

Most vehicles engines can run on CNG by installing a CNG kit. Kit assembling of many components is required to run existing vehicle on CNG. There are few basic components which are common in all type of kits, irrespective of the vehicles such as CNG storage cylinder, high pressure tube, pressure regulator, pressure gauge, change over switch, high pressure tube fittings, refuelling receptacle and air fuel mixer.

- CNG cylinders are installed under chassis/dickey at vehicles to store fuel
- High-pressure tubing connects the cylinders and engine
- A low-pressure regulator is installed to supply Gas to engine as per need
- A refuelling connector is provided for refuelling gas in the vehicle
- A low-pressure hose supplies gas from regulator to engine



CNG CONVERSION KIT COMPONENTS

- Pressure Regulator
- Petrol Solenoid Valve – Stops petrol flow when operating on CNG
- On-Off valve and refuelling connector – Opens or stops gas flow to the regulator and includes a refuelling device
- Control Module/Change-over switch – Electronic control component with fuel selection switch
- CNG level indicator- Shows CNG quantity on vehicle dashboard
- Gas-Air Mixer
- CNG cylinder tank with valve, vapour bag & bracket
- Petrol hose
- Low-pressure gas hose
- Ignition advance processor
- High-pressure gas tube
- Wire Harness
- NRV in petrol return Line
- Pressure gauge

BEWARE OF LOW QUALITY/INFERIOR KITS

Countless CNG conversion kits look comparable making similar claims but, while in use or in operation, the content inside the box, can be very different.

Quality should always be your priority over price.

A LITTLE HISTORY

In the early 2000s, many CNG (and LPG) conversion kits came onto the market that required tampering with the vehicle's factory emissions settings.

These kits would reprogram the vehicle's **Powertrain Control Module (PCM)** to change the way it managed fuel supply, interfere with the **Vehicle Oxygen Sensors (Lambda Sensors)**, and block "Check Engine" lights from appearing. Meaning that your engine could be running too rich or too lean fuel mixture and the driver may not know, leading to catalytic converter failure and increased emissions. Consequently, the **EPA began regulating and certifying** alternative fuel conversion kits.

ZIP-TECH, market genuine and guaranteed kits, that work in with your vehicle's factory installed electronics and sensors.

ZIP-TECH CNG CONVERSION KIT:

WORKING PRESSURE

- The kit must be rated for 3,600-psi, working pressure, this is the required pressure rating for **USDOT** approved CNG cylinders tanks
- Many **Pressure Regulators (Reducers)** are rated for engines up to 275hp (Horsepower). While they will still function on higher-power engines, the regulator begins to fail within a few thousand miles, delivering an inconsistent output pressure that affect the fuel mixture and efficiency.
- Some systems employ two regulators (**dual reg setup**) to maintain good tuning on larger engines. However, they wear out faster and they introduce additional high-pressure connections that are cumbersome to install and prone to leaks.
- Dual regulators also struggle to provide sufficient fuel flow rate while maintaining desired output pressure. High-performance injectors work best when supplied with at least **2 bar (40 psi)** fuel pressure.
- Some older kits are single-stage regulator line. They are outdated cheap technology that fail to reduce the pressure from 3,600-psi fast enough to deliver a steady output pressure to the injector rails.

We supply multi-stage regulator based on the **Tomasetto Super Model**, featuring upgraded springs, that allows us to rate it for 320 horsepower, it can deliver over 70 kg/hr fuel flow rate.

Again, we offer heavy-duty version for larger engines (up to 8.0 litres) which can deliver fuel rates over 150 kg/hr.

MIXED-AND-MATCHED KIT

In some lower-priced kits, the components look “mixed and matched”. They might include a reliable regulator, for example, but the rest of the parts may have been sourced from lower quality manufacturer. Tell-tale signs is when supplier fail to supply complete parts list or an installation manual in English (including instructions for the calibration software).

Mixed-and-matched kits have no parts warranty.

MISLEADING CLAIMS

Beware of kits that claim:

- they will work on pre-1996 vehicle engines. Since **OBD** changed, the kit will not operate properly, purchase kit designed for **OBD-II**.
- to fit all engine sizes, Sequential CNG injection kits are specific to the number of cylinders in the engine.
- to be **EPA Certified**, EPA kits have only been certified for a very limited range of vehicles and year model.

THE BOTTOM LINE

Dual Fuel kit and installation cost money, but the payback is swift for transporters, fleet owners and regular commuters. It is probably the most intelligent discission you ever made as far is mobility fuel is concern, and the best green alternative.

FLY-BY-NIGHT INSTALLERS

Watch out for installers, selling CNG Kits and equipment out of the backyard or garages, and do not carry out dual fuel installations on regular basis.

ZIP-TECH has been in business since 2007, a multinational company, and driving force in Nigeria in alternative fuel policy development and standards

Quality, Trust, and Reliability (QTR) cannot be compromise, therefore reframe from performing inferior and regrettable dual fuel conversion.

If you are not sure, ask [ZIP-TECH](#).

For technical support:

- Phone: 0815 483 3664
- E-mail: contact@ztenig.com

The Process

Customers looking to convert their vehicle must contact the ZIP-TECH service centre by phone on **0815 483 3664** or visit any of our [conversion centres](#) to obtain information and start the process.

We shall issue you a conversion ticket request form containing all relevant information you have provided on the phone or by email regarding your location, vehicle type, financing (if require), date and time of conversion.

Conversion kits are available for most vehicles with 4, 6 and 8 cylinders.

The conversion process takes approximately 4-6 hours. This is a dual fuel system, where the petrol tanks is retained for usual use, while gas utility is add i.e., a tank will be installed in additional to petrol tank. This cylinder tank is typically installed in the vehicle's boot, or sometimes beneath the vehicle.

Customers must provide the following documents for the conversion process:

Fleet / Commercial Customers	Private Customers
Letter from the company signed by an authorized person	Approval from the customer which can also be sent via email or fax
Trade License	valid ID/passport copy/ Bank statement/vehicle registration document/residential document (utility bill/property ownership)
Property/Govt papers/Proof of ownership	Proof of Property
Bank Guarantee or LPO	Employment details/Banking detail
Contact Details	Next of kin and Applicant detail/Bank Approval

The CNG/LPG/LNG stickers

To identify that a vehicle has been converted to CNG/LPG or LNG, three stickers will be placed:

- **Identification sticker:** Identifies the vehicle was converted and certified
- location: **Front window and top passenger side.**
- **Commercial sticker:** Marketing the CNG/LPGLNG business
- location: **Petrol filling port.**
- **Cylinder sticker:** Identifies the cylinder re-inspection date
- location: **NGV Cylinder.**

Appendix

Relationship between horsepower and cc e.g., how many cc in a hp?

There is about **14 to 17cc** = 1 hp or about 1 cu.in

What Is HP?

Horsepower is a measurement unit for work performed by an engine, considering how efficient it works. James Watt, created the term horsepower based on his estimation that the work performed by an average horse in 60 seconds is 33,000 foot-pounds.

One HP produced by an engine is equivalent to 33,000 foot-pounds. So, if an engine produces 500HP, the amount of work it produces is 16,500,000 foot-pounds.

How Do You Compute for Engine Capacity?

To compute vehicle's engine capacity, use the formula:

- $V = \pi/4 \times (D)^2 \times H \times N$

Where:

- V: Cylinder Volume or CC
- π : 3.14
- D: Bore's Diameter
- H: Stroke's Length
- N: Number of Cylinders

You can usually find the automobile engine's bore diameter, stroke length, and number of cylinders on the user's manual and manufacturer's website.

Why Does CC Matter?

The engine's cc will have a direct effect on the following:

- **Power** put

Engine displacement or capacity affects engine's torque and horsepower. Generally, a high-capacity engine will suck more air into its cylinder/s, increasing the air volume present. This increases the amount of fuel inside vehicle's engine. Thus requiring more power to burn the fuel present.

Therefore, the engine's capacity is directly proportional to the engine's power output.

- **Fuel Efficiency and Mileage**

As power output increases, fuel consumption increases, as this happens, there is a reduction in fuel mileage. Meaning fuel mileage and efficiency is inversely proportional to the engine's cc.

Compute Engine HP?

To compute for horsepower, use the formula:

- $\text{Horsepower} = (T \times \text{RPM}) / 5,252$

Where:

- T: Torque
- RPM: Speed

Why Does Horsepower Matter? Engine's horsepower is vital because of its effect on the following:

Speed