



Installation Manual for CNG Kit

Gasoline/CNG

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Table of Contents

CNG Fuel System	3
Diesel Engines Converted To Use Natural Gas	3
Installation Manual for NGV Kit	4
Advantages of using CNG	4
Pre-installation	4
Installation	5
REDUCER / MIXER SYSTEM	6
1. Regulator (Reducer)	6
2. Filling valve	7
3. High pressure pipe	8
4. Cylinder brackets	9
5. NGV Tanks and their Valves	9
6. Mixer	10
7. Closed-Loop System	11
8. Petrol / CNG Selector switch - MULTIPLEX	11
9. Gasoline electro valve	11
10. Manometer	12
11. Heating System	12
12. Injectors Emulator	12
13. Oxygen Sensor Emulator	13
14. Timing Advance Processor	13
15. Test for Leaks	13
TUNING OF VEHICLE AND DETAILED DESCRIPTIONS	14
The Omnitek CNG60 Compressed Natural Gas Pressure Reducer	15
Function	15
Installation	16
Adjusting Reducer	16
The Omnitek Closed-Loop Control System CLCS600	18
The Omnitek MULTIPLEX Switchover Switch	21
The Omnitek Oxygen Sensor Emulator	24
The Omnitek Emulator for Fuel Injectors	26
The Omnitek Timing Advance	29
Troubleshooting	32
Inspections	32
Recommendations to users	33
To load gas	33
CNG REDUCER REPAIR KIT	34



CNG Fuel System

Basically there are two systems available and diesel engines that have been converted to operate on natural gas require additional components as well as some mechanical modifications to the engine.

1. Simple system of Reducer and Mixer (capable of achieving EURO II Emission Standard) can be used on gasoline engines with carburetor or fuel injection systems, as well as on diesel engines that have been converted to operate on natural gas (cannot be used on turbo engines). For diesel engines converted to operate on natural gas please see additional points below.

The installation kit may include following parts:

Natural Gas Pressure Regulator/Reducer	Selector Switch (Multiplex)
Gas Mixer	Gasoline Electro valve
CNG Cylinder and Cylinder Valves	Manometer
Gas Filling Valve	Closed-loop Control Module with Stepper
High-pressure Lines	Catalytic Converter

2. Electronically controlled gas injection (capable of achieving EURO IV Emission Standard) Can be used on gasoline engines with carburetor or fuel injection systems, as well as on diesel engines that have been converted to operate on natural gas (can be used on turbo engines). For diesel engines converted to operate on natural gas please see additional points below.

The installation kit may include following parts:

Natural Gas Pressure Regulator	Selector Switch
Electronic Gas Injector	Gasoline Electro valve
CNG Cylinder and Cylinder Valves	Manometer
Gas Filling Valve	Electronic Control Unit (ECU)
CNG Filter	Various Sensors
High-pressure Lines	Catalytic Converter

Diesel Engines Converted To Use Natural Gas

Diesel engines that have been converted to operate on natural gas require additional components as well as some mechanical modifications to the engine and the installation of an ignition system.

Additional parts needed:

Engine Speed and Crankshaft Position Sensor	Spark Plugs
Ignition Controller	Spark plug Wires
Ignition Coils	Pistons (lower compression)
	Piston Rings

Mechanical Components as Required (the engine may require a complete remanufacturing if cylinders, valves, camshafts, etc. are worn out past specifications)



Installation Manual for NGV Kit

Advantages of using CNG

Natural Gas for Vehicles (NGV) is a fuel for internal combustion engines that is basically composed of Methane gas and its use offers extraordinary advantages.

NGV, unlike gasoline, does not contain lead because of its high octane rating (120-130). As combustion is more complete, the contaminating effects of the exhaust gas emissions are reduced by approximately 80%. These gases are also less corrosive, thus increasing the duration of the exhaust system. NGV keeps the spark plugs clean, prolonging their use; it does not contaminate the oil, doubling the time required for oil changes and that of the filters; it improves lubrication because the cylinders are not washed by gasoline excess, thus avoiding premature wear in the motor.

In today's world there are constant advances in all aspects that concern security in case of automobile accidents; in gasoline vehicles the fuel is transported in thin sheet metal tanks that are very fragile when impacted and can explode. CNG is stored in steel cylinders with 6 to 8 mm thick walls; this literally makes it the most resistant component of the vehicle. The steel fuel pipes are also more resistant than the gasoline ones; even if there were to be an accidental breakage or leak, instead of the dangerous gasoline spill on the ground underneath the vehicle, the very light NGV will rise rapidly and dissipate into the air.

Pre-installation

There are a few checks that need to be performed before the vehicle enters the installation workshop for conversion, to determine whether it is suitable for installation of the NGV equipment.

The structure of the vehicle must be inspected, to check if it is in a good state that allows adequate fitting of the supports of the various elements such as the NGV tank (s), the pressure regulator, the high-pressure pipe clamps, etc.

To make sure that the motor functions properly, check the following:

The ignition system: spark plugs, spark plug cables, contact points, condenser, ignition coil, ignition plate and distributor. The faulty state of any of these parts will cause a poor ignition spark, thus hindering the good functioning of the equipment.

The battery must provide 12 volts of power to the pressure regulator so that its electrovalve will open properly when the vehicle is operating on gas. The engine's carburetion system must also work properly because even though a NGV system is being installed, the vehicle must be capable to operate in bi-fuel mode (gasoline/gas).



If the vehicle is not in good condition, the installation of the NGV system will not result in a satisfactory operation vehicle.

Installation

The installation of the gas equipment comprises the following parts:

- Pressure Regulator (Reducer)
- Gas/Air Mixer (or Electronic Fuel Injector)
- NGV Filling valve
- High-pressure Lines
- NGV Tank and Valve
- Gasoline/NGV Selector Switch
- Manometer
- Gasoline Electro valve (if needed)
- Heating system
- Emulator

The entire NGV System installation must be done in such a way as to avoid any complications or interference with the normal maintenance tasks such as exchanging a battery or an air filter.

REDUCER / MIXER SYSTEM

1. Regulator (Reducer)

The pressure regulator must be firmly attached to the vehicle's body, making sure that there is no movement whatsoever. The location of the regulator must comply with the following conditions:

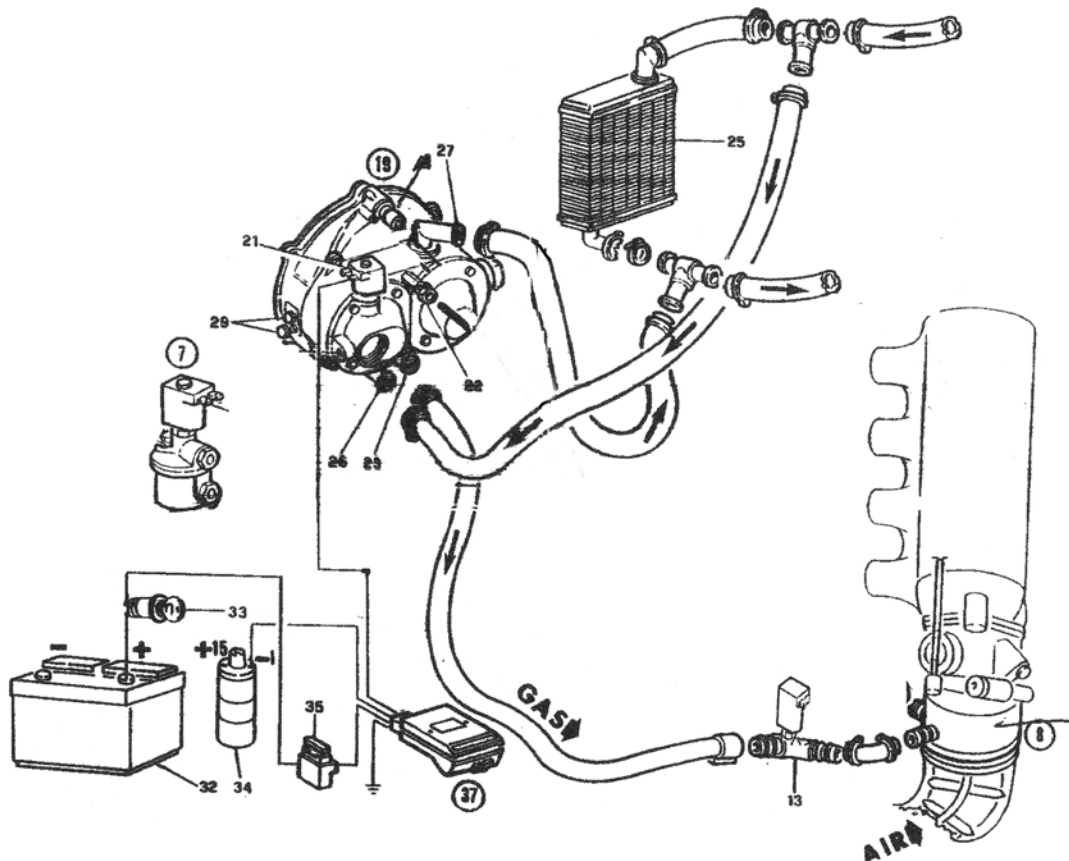
It must be go on a flat surface that allows the firm placement of the support bracket so that the vehicle's vibration will not loosen it.

The manometer must be placed on the regulator in such a way that it can be easily read at the time of filling the gas tank; therefore, the pressure regulator must not be installed under any part of the motor that blocks the view of the manometer.



NGV KIT (Reducer / Mixer)





It is also imperative that the regulator be placed perpendicularly to the driving direction of the vehicle. This is a necessary precaution so that that the vehicle's movement does not affect the membrane of the 3rd. stage of the regulator that commands the motor's gas requirements.

The Regulators must not be placed too far from the gas/air mixer, so that the distance that the gas must cover is not too large, thus allowing better operation at start-up time.

2. Filling valve

The filling valve must be mounted with a specially designed metal bracket, which is to be affixed to the vehicle body with bolts.

The bracket of the filling valve has a hole; a part of the valve passes through it and the end is fixed with a nut. Both the bracket and the valve must be rigidly mounted to withstand the pressure of the hose nozzle every time gas is loaded.



This component must not be installed near the car battery, to avoid the possibility of a spark while loading; a spark combined with gas can cause an accident. It is also advisable to place it near the regulator, so as to be able to control the filling pressure with the system manometer.

3. High pressure pipe

The installation of the high-pressure piping can be divided into four sections.

Section 1: Filling Valve - Reducer

Section 2: Cylinders - Filling Valve

Section 3: Stretch between cylinders (only when installing more than one cylinder)

Section 4: Cylinders - External Filling Valve (Optional)



A “loop” must be made in the Section “filling valve – reducer” every time there is a change in direction of the pipe, or only one if the pipe maintains one direction. It is very important that this section be as short as possible, to avoid passing over other equipment in the engine bay.

The following precautions must be taken in the Section “filling valve – NGV cylinders”:

Securely fasten the fuel pipe to the vehicle body using galvanized metal or plastic clamps so that there is no movement whatsoever. The fasteners or clamps should not be placed at a distance exceeding 600 mm.

As in the case of the previous Section, every time there is a change in the direction of the pipe, a “loop” must be made.

The piping that goes under the vehicle must not “hang”; it must be placed over some fixed part of the vehicle’s body that can act as its support base.

In case the high-pressure pipe must enter the trunk of the car, it should be on the same side as the filling valve, so that the high-pressure pipe does not cross under the vehicle or behind the motor.

Do not place the high-pressure pipe next to the exhaust pipe of the car, since a leak of exhaust gases, which are corrosive, can corrode the high-pressure piping.

Should more than one cylinder be installed, the piping between them must have a “loop” to absorb vibrations. This only applies if the cylinders are next to each other; if they are separated, follow recommendation in Section “filling valve – reducer”.

Note: Always assure that the ends of the high-pressure pipes are without burrs and no dirt or metal filings have entered the pipe.

The Section “external filling valve – tank” is optional; it does not substitute the placement of the conventional filling valve. It should be securely mounted near the gasoline tank filler.

4. Cylinder brackets

Because of the weight of the NGV tanks, this bracket has to withstand great mechanical stress. The forces that act on it are very high and can tear it off in a collision; therefore, this bracket must be adequately mounted, with four bolts of no less than M10 with their corresponding lock washer and nuts.

The brackets for the NGV cylinders or cradles are specific for each cylinder and for each type of vehicle. They are made up of the following parts: iron bracket on which the cylinder(s) rests, a pair of metallic bands covered with a plastic sheath that avoids friction between the metals and a pair of rubber straps to be placed between the cylinder and the above mentioned bracket, also to avoid contact between the metals.

The placement and location in the trunk should be such that it takes up the least possible space.

5. NGV Tanks and their Valves

The tanks have a valve that must be installed very tightly. For this purpose, the cylinder is placed on a specially prepared bracket-clamp that will hold the tanks while the valve is installed avoiding its turning when the valve is being tightened.

Before installing the valve in the cylinder thread, 30 rounds of Teflon tape must be applied for better sealing. The valve must be tightened in the cylinder with no greater than 25 kgm.

The cylinders should be placed in the same direction as the car axels.

The Manual Safety Valve must be easily accessible, so that it can be closed without problems in case of a leak.

On the same side on which the cylinder valve is placed, two holes have to be made in the lower part of the trunk, to place the ventilation nozzles. These holes will allow ventilation of any gas leakage that the cylinder valves may have. To achieve this, before connecting the high-pressure piping to the valve, a ventilation bag must be placed on it and on the ventilation tube on the high-pressure piping.



Finally, after connecting the piping to the valve, the bag over the already placed ventilation tube must be closed, and another stretch of piping taken to the other nozzle; this connection is done with metal clamps, whereas the junction between the tube and the bag is done with plastic clamps. Closing of the ventilation bag is only to be done after leakage controls have been made (see “12. Test for Leaks” in this same Manual).

When the valve is placed on the cylinder, it is advisable that the markings on the cylinder (indicating cylinder number, date of manufacture and capacity) remain visible. This will simplify reading any data that may be needed.

When cylinders are installed under the chassis of a light truck, following recommendations should be followed:

Before installation, check if the length of the cylinders are suitable for that particular truck.

In some cases it may be necessary to alter the routing of the exhaust pipe.

Cylinders under the chassis must be installed at no less than 250 mm from the ground, with the valve towards the rear of the vehicle, to avoid scraping the ground.

6. Mixer

When placing the mixer, special care must be taken to ensure that there is no inflow of air due to a faulty joint.

NOTE: Make sure that the mixer is exactly the one that corresponds to that engine.



Currently two types of mixers are available: 1) in cases where the air filter is just above the carburetor; 2) in cases where the air filter is separate from the carburetor, placing the mixer on the hose that joins them and not over the carburetor.

In both cases, the pressure regulator and the mixer must be connected by means of a fire-resistant hose, in which must also be installed the “maximum gas flow adjuster” (Power Screw). As previously stated, the fire-resistant hose must run the least possible distance between the pressure regulator and the mixer.

All joints must be made with clamps. It is also advisable to fasten the hose to some fixed part of the vehicle with a plastic tie.

7. Closed-Loop System

The CLCS600 closed-loop lambda control system reliably controls the Air/Fuel ratio of natural gas (CNG) or propane (LPG) engines at all operating conditions to stoichiometric. This reduces tail pipe emissions and fuel consumption.

Included are the electronic control module, a high-resolution stepper motor gas flow metering valve and a wiring loom. Feedback from original or retrofit throttle position sensor (TPS), or manifold absolute pressure sensor (MAP), as well as an exhaust oxygen sensor is all that is needed to provide the performance needed to keep the A/F ratio to EURO II or EURO III levels. (high efficiency catalytic converter is needed).



8. Petrol / CNG Selector switch - MULTIPLEX

The switch should be installed at an easily accessible location in the dashboard, so that the change of fuel can take place effortlessly while driving and the lights of the switch are easily visible.

The wires that connect the switch to the different parts of the system must pass from the dashboard to the engine bay and should be secured by plastic ties. All connections must be made with the terminals supplied for that purpose.



To identify each cable, you must resort to the wiring diagram.

9. Gasoline electro valve

The electro valve (carbureted engine only) is placed between the gasoline filter and the carburetor, interconnected by gasoline resistant rubber hoses and metallic clamps.

When installing the gasoline electrovalve, special care must be taken as to the direction of the fuel flow, indicated by a small arrow on the valve.

As in the case of other components, the electrovalve must be fastened to the vehicle by means of the corresponding bracket,



taking care that it is not installed over any other electric part that may create a spark or that the flow of gasoline in the hose does not run towards any element that may create a spark.

In view of the above, the clamps that are placed on the gasoline electrovalve require the greatest care and attention. It is most advisable to check all the other clamps of the gasoline system, particularly those between the gasoline pump and the electrovalve, because when closing the flow of gasoline the pressure is greater than normal in that stretch.

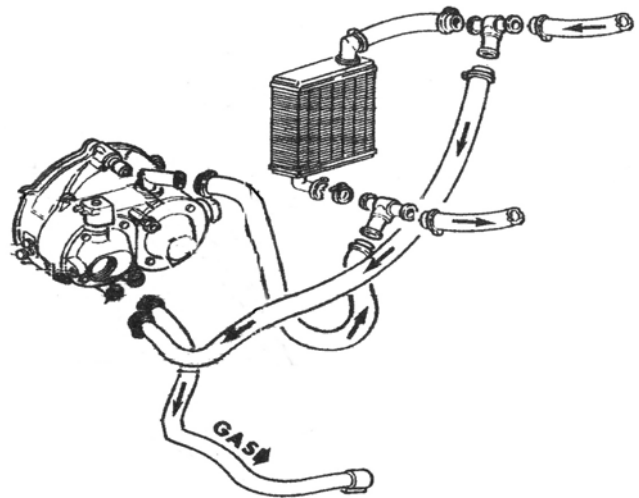
10. Manometer

The manometer (only if used) must be placed in such a way that it is easy to read during filling. It must be installed on the high-pressure gas inlet of regulator and connected to the selector switch to indicate the pressure of the gas in the cylinder.



11. Heating System

In view of the expansion of gas when the pressure falls from 200 bar to 3 bar, there is a great cooling effect in the first stage of the regulator. To counteract this effect the regulator needs to be heated, which is done by circulating hot water through this stage. This requires that the hoses that carry the engine cooling water be cut and detoured to the regulator via two “T” connectors. The hoses to use should preferably be those that come and go from the radiator of the vehicle.



12. Injectors Emulator

Allow for the electrical interruption of the vehicles petrol fuel injectors, without affecting the operation of the vehicles ECU and onboard diagnostic systems.

As pollution standards get stricter, the manufacturers equip their vehicles with more and more sophisticated electronic control units (ECU), which constantly check the operation of each component (Self-diagnosis System, or OBD). Therefore, interrupting the Petrol injectors when running on CNG is construed as a failure by the ECU (turning on the indicator on the dashboard - CHECK ENGINE).

The Injector Emulator intercept the original injector signals (when on CNG) and emulates a correct signal, so no codes get set.

13. Oxygen Sensor Emulator

An important component for the good working of the engine is the Oxygen Sensor. While working on CNG, it transmits an incorrect signal to the ECU and the “CHECK ENGINE” lamp will come on.

The Oxygen Sensor Emulator interrupts the sensor signal and emulates a correct signal, so no codes get set.

14. Timing Advance Processor

In order for the engine to run optimally when operation on CNG, the ignition timing must be more advanced. The Timing Advance Processor (TAP) advances the timing as required (up to 15 degrees).

15. Test for Leaks

Once the equipment has been installed, the cylinder valves must be closed and the system loaded with gas through the filling valve and all the joints must be inspected with soapy water to detect any possible leaks in the circuit. After the inspection, the vehicle is turned on with gas and the system is regulated.



TUNING OF VEHICLE AND DETAILED DESCRIPTIONS

The Omnitek CNG60 Compressed Natural Gas Pressure Reducer

The CNG60 natural gas pressure reducer offers excellent performance and value. The CNG60 reduces the gas pressure of up to 200 bar to atmospheric pressure under all working conditions. The reducer uses technology that regulates the gas pressure extremely accurately and can respond to changes in driving conditions and gas demand very quickly. The innovative stabilizer technology guarantees precise gas flow even at very low supply pressure. The CNG60 features a controlled-coolant-flow heating circuit that assures constant gas temperature (electric heater available) and can be used on engines up to 12 liter and 300 horsepower.

Adherence to even the strictest emissions requirements is assured when used in combination with the Omnitek CLCS600 Closed-Loop Control System.

- CNG60R – up to 4 Liter Engines and 220 Horsepower
- CNG60L – up to 12 Liter Engines and 300 Horsepower
- Gas Pressure Stabilizer Technology for Precise Gas Flow
- Positive Pressure Idle Circuit for Easy Starting
- Dual Gas Outlet for Large Displacement Engines
- 12 Volt Electronic Safety Valve
- Overpressure Safety Valve
- Integrated Sinter Metal Filter
- Controlled-Coolant-Flow Heating Circuit
- Electric Heater Optional
- Pressure Gauge and Indicator Optional



	CNG60R	CNG60L
For Engines	4 Liter / 220 Hp	12 Liter / 300 Hp
Gas Flow	55 L/Hr	65 L/Hr
Working Temp.	-25° C to 100° C	
Voltage	12 V	
Gas Inlet	6 mm	
Gas Outlet	2 Male 17 mm	
Coolant Inlet/Outlet	Male 12 mm	
Idle Screw	Yes	
Shut-Off Solenoid	Yes	
Safety Valve	Yes	
Electric Heater	Optional	
Certification	ISO 15500	

Function

- The compressed natural gas enters the reducer at up to 200 bar (3000 psig) pressure. The optional manometer displays the actual pressure of the gas.
- The gas enters the 1st stage of the reducer where the pressure is reduced to 3.8 – 4.8 bar. The gas pressure stabilizer technology is active.

- The gas enters the 2nd stage of the reducer where the pressure is reduced to 0.8 – 1.5 bar.
- The gas enters the 3rd stage past the electric solenoid valve, which is open only when 12 Volts are applied.
- A small amount of gas bypasses the 3rd stage for easy starting and idle control (adjustable needle valve). This unique feature guaranties easy starting and virtually eliminates the risk of backfire.
- In the 3rd stage, intake manifold vacuum moves the membrane according to engine load and RPM. A dampener provision stabilizes the flow and prevents excessive erratic movement of the metering membrane, assuring smooth engine operation and lowest exhaust emissions. On large engines the atmospheric side of the membrane is connected to the air cleaner for additional dampening.

Installation

- Secure the reducer to the vehicle bodywork.
- Install away from heat sources.
- Install below the minimum level of the coolant recovery reservoir.
- Install upright and parallel to the driving direction of the vehicle.
- The supply hose between the reducer and the mixer must be as short as possible.
- Protected reducer against possible acid leaks from battery.
- Possible leaks from the safety valve must be routed outside the engine bay (ECE 67/01).

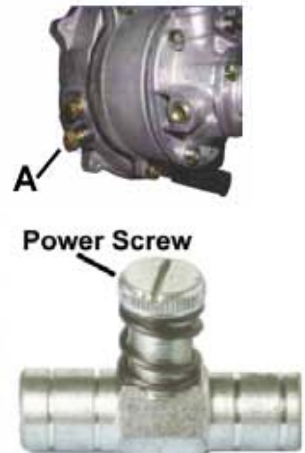
Adjusting Reducer

Start the vehicle and wait for the engine to reach operating temperature (coolant gauge).

- For the carburetor vehicles: Switch the switchover unit to neutral and wait for the carburetor container to empty completely then switch the switchover unit to gas.
- For injection vehicles: Run the engine at idle, switch the switchover unit to gas. The gas LED will start to flash. Accelerate/decelerate to switch to gas.

A) VEHICLES WITHOUT CLOSED-LOOP SYSTEM CLCS600

- 1) Tighten Power Screw some.
- 2) Accelerate the engine to 3000 / 3500 RPM and hold steady. (large engines use 2000 2500 RPM).
- 3) Adjust the gas flow by turning the Maximum-Power Screw until the engine runs best (not too rich and not too lean).
- 4) Let engine idle and adjust the Idle Gas Screw “A” until the engine runs best (not too rich and not too lean).
- 5) Repeat step 3 and 4 to verify best adjustment.



- 6) Check the performance of the vehicle on the road, ensuring that it does not stall when hard accelerating, stopping and when making turns.
- 7) Repeat from step 2 if necessary.

For step 3 and 4 it is best to use an exhaust emissions gas analyzer.

B) VEHICLES WITH CLOSED-LOOP SYSTEM CLCS600

- 1) Install the closed-loop controller CLCS600 according to instructions.
- 2) Accelerate the engine to 3000 / 3500 RPM and hold steady. (large engines use 2000 2500 RPM).
- 3) Adjust the gas flow by turning the Maximum Power Screw on the Stepper Motor T until the adjustment is correct (Red & Green light on the handheld Display/Tuner flashes alternately).
- 4) Let engine idle and adjust the Idle Gas Screw "A" until the Red & Green light on the handheld Display/Tuner flashes alternately.
- 5) Repeat step 3 and 4 to verify best adjustment.
- 6) Check the performance of the vehicle on the road, ensuring that it does not stall when hard accelerating, stopping and when making turns.
- 7) Repeat from step 2 if necessary.



-- Also Follow CLCS600 Installation Instructions --

The Omnitek Closed-Loop Control System CLCS600



Lambda Control System (EURO III)

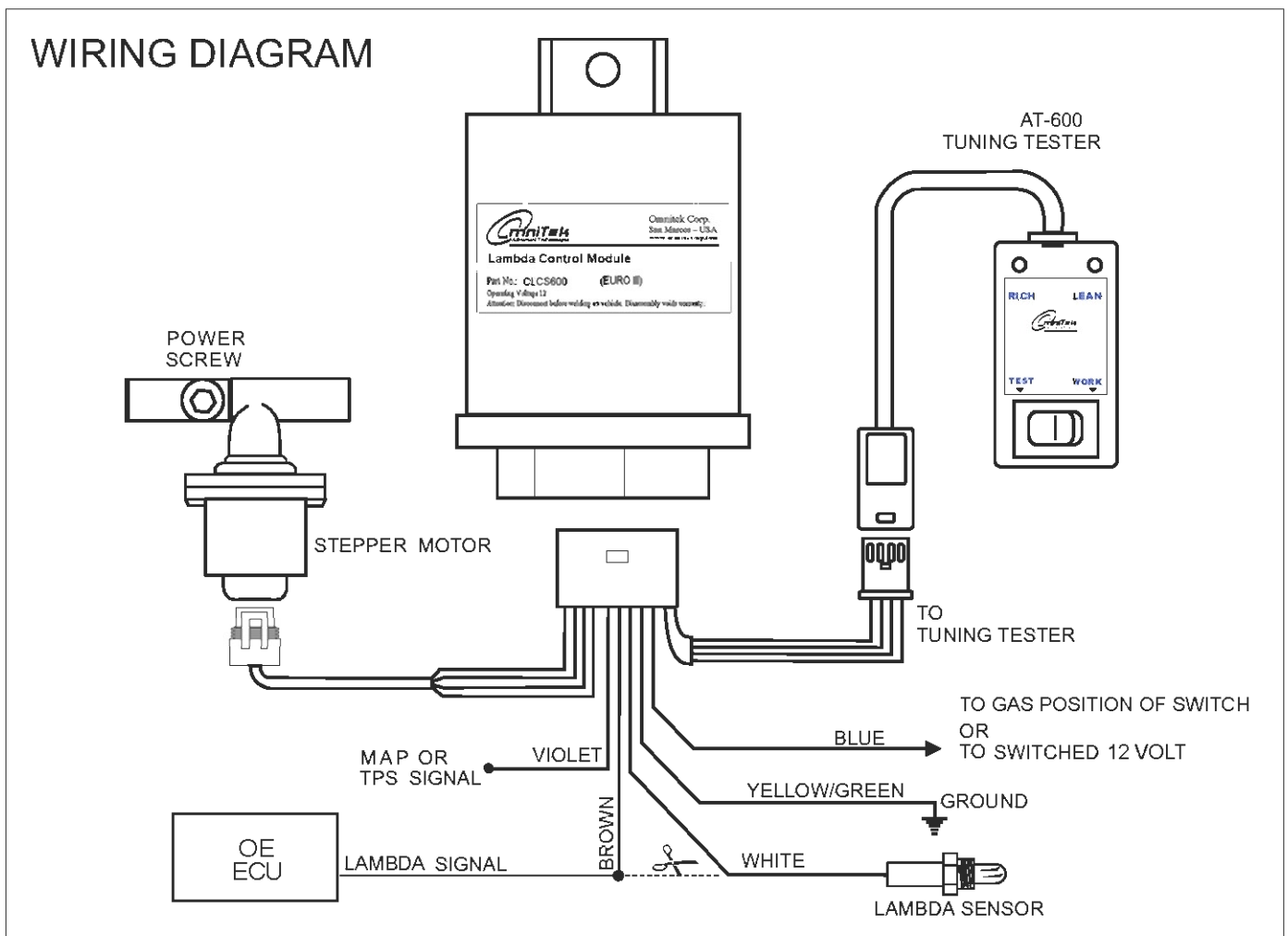
CLCS600

The CLCS600 closed-loop lambda control system reliably controls the Air/Fuel ratio of natural gas (CNG) or propane (LPG) engines at all operating conditions to stoichiometric.

This reduces tail pipe emissions and fuel consumption.

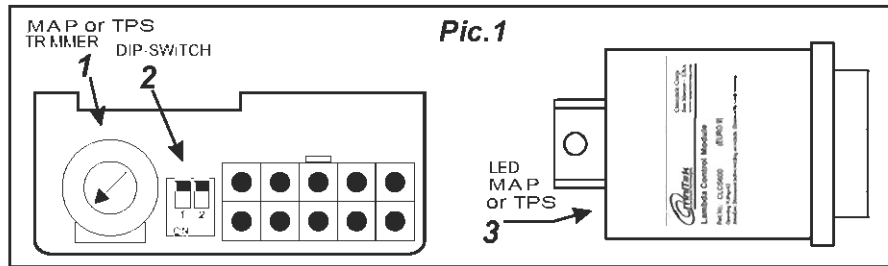
Included are the electronic control module, a high-resolution stepper motor gas flow metering valve and wiring loom.

Feedback from original or retrofit throttle position sensor (TPS) or manifold absolute pressure sensor (MAP), as well as an exhaust oxygen sensor is all that is needed to provide the performance needed to keep the A/F ratio to EURO II or EURO III levels. (high efficiency catalytic converter is needed).



Lambda Control System (EURO III)

CLCS600



INSTALATION

Locate and fix the CLCS600 Lambda Control Module in a vertical position, away from any heat source and protect from water contact.
 Ensure the wiring connection port is facing downwards to prevent water entry into circuitry.
 Make sure the wiring connections as per the wiring diagram.
 Install the stepper motor in the vapor supply line, as close as possible to the gas mixer.

CALIBRATION

Start the engine, allow to warm up to operating temperature and roughly adjust the power screw to mid range or until smooth engine running is obtained, with the engine running at approx. 2500 RPM.
 Allow the engine to idle at approx. 850 RPM, adjust the idle mixture on the gas converter until smooth idling is obtained.

With the engine idling smoothly, turn the MAP trimmer (See pic. 1, Item #1) so that the red light (item #3) just switches off. This light should turn back on as soon as the accelerator pedal is slightly depressed.
 NOTE: Where there is no need for the stepper motor to control at idle, leave the violet MAP/TPS wire Disconnected and properly insulated.

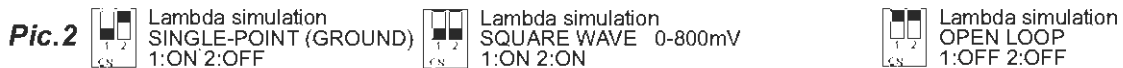
Connect the Tester (AT-600) to the CLCS600 Lambda Control module as shown in the wiring diagram and switch to "Test" position.
 Increase the engine speed and hold at 3500 RPM. Turn the power screw on the stepper motor until the Red light on the Tester (AT-600) is "ON" and constant, indicating "Rich" mixture.
 Allow the engine to idle. Adjust the idling mixture on the converter until the red LED light on the Tester (AT-600) is "ON" and constant, indicating "Rich" mixture.
 Change the switch position on the tester (AT-600) to "Work" mode, to memorize the calibration.
 To verify the calibration: once again increase the engine speed to 3500 RPM and hold. The LED lights on the Tester (AT-600) should now alternate between Red and Green, indication that the air to fuel ratio is now running stoichiometric. The calibration is now completed.

Test the vehicle on the road and verify by means of the Tester, that even when driving the Red and Green LED's alternating correctly. If the condition found is too lean (more time for the Green LED ON), unscrew the power screw by a half turn.
 (NOTE: Engine speed of 3500RPM is indicative only)

EMULATION SELECTION ← not used with mono-fuel applications (CNG only) (only used on petrol + CNG bi-fuel applications)

three modes of Lambda probe emulation. (see pic. 2)

↓ use this setting



The Omnitek MULTIPLEX Switchover Switch



Safety switch and LPG or CNG indicator K203

FEATURES

The change-over switch K203 is equipped with a two positions switch. It allows for the following features:

- ✧ GAS FUEL POSITION — engine runs on gas.
- ✧ PETROL FUEL POSITION — engine runs on petrol.
- ✧ EMERGENCY

The change-over switch K203 is equipped with a SAFETY feature, which prevents gas to flow to the regulator (hence to the engine) in case the engine accidentally dies. The change-over switch K203 can be used for LPG and natural gas.

On GAS position the fuel level (3) is displayed with four GREEN LEDS and one RED LED for reserve. After the first thirty seconds, the switch slows down the updating of the fuel level, to improve display performance.

CHANGE TO GAS

When the switch is in GAS position ("G" Pic.1) the engine starts on petrol. The change to gas is made automatically when accelerating, as soon as the engine runs above the RPM setting, adjusted during installation.

RPM SETTING FOR THE AUTOMATIC CHANGE – OVER TO GAS.

- ✧ Turn the trimmer in the back of the unit fully clockwise (without forcing).
- ✧ Turn the engine on, with the switch in GAS position ("G" Pic.1), the yellow led (NO.2 Pic.1) is blinking.
- ✧ Push the accelerator pedal to reach the desired RPM for the change-over to gas fuel.
- ✧ Turn the trimmer counterclockwise to get the yellow led (NO.2 Pic.1) fully ON.

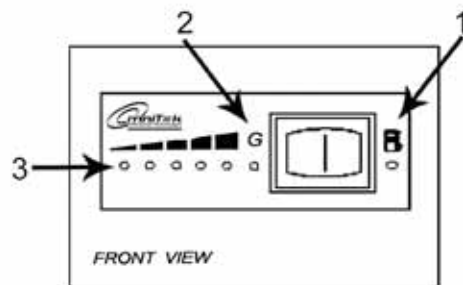
NOTE: the factory presetting is 2500 RPM approx.

(the change-over actually occurs the first time the RPM goes past the set level and descends 200 RPM - ie shift from 1st to 2nd gear)

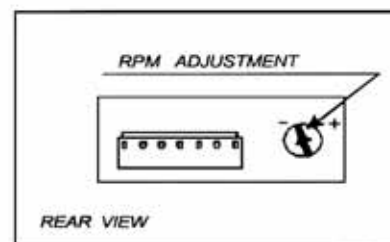
EMERGENCY

This feature allows to start the engine on gas immediately, by-passing the petrol start.

- ✧ The switch has to be set to GAS position ("G" Pic.1)
- ✧ Turn the key ON (do not start the engine)
- ✧ Turn the switch to the "B" Pic.1 position and than back to the "G" Pic.1 position
- ✧ Start the engine now

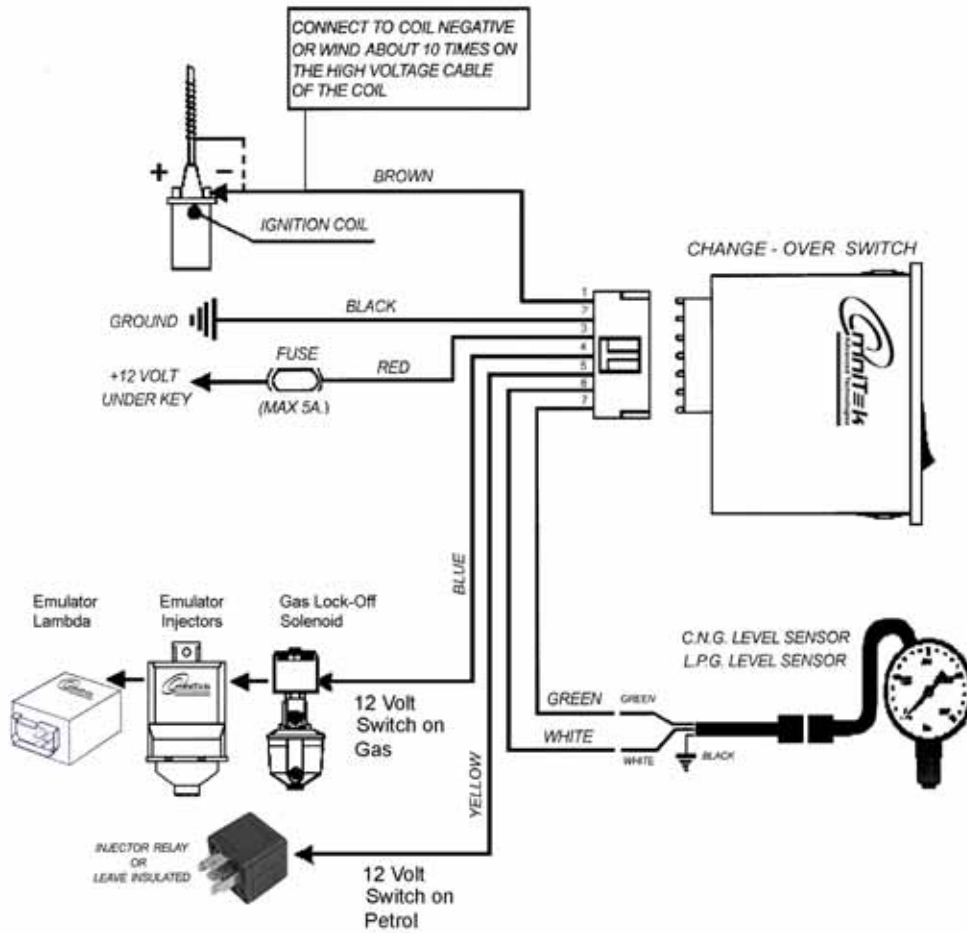


Pic.1



Pic.2

WIRING DIAGRAM




The Omnitek Oxygen Sensor Emulator



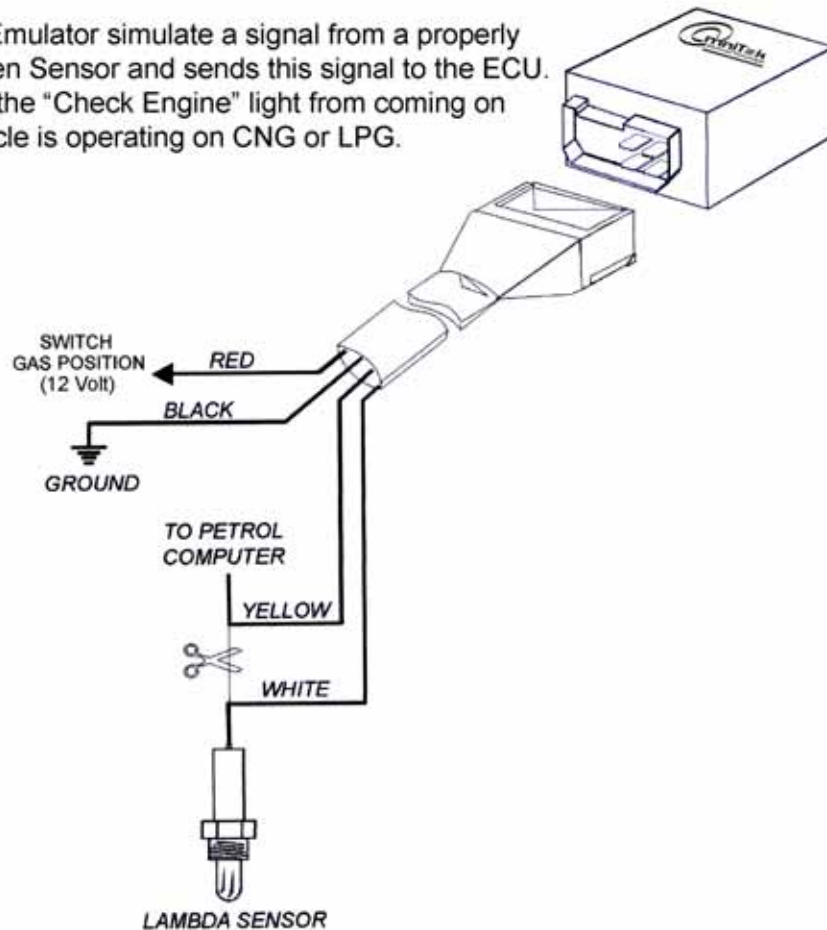
Lambda Emulator YF3

Working Parameters

1. Working voltage: DC 10V – 15V
2. Working current: <50mA
3. Signal: 0-1V 

Wiring Diagram

The Lambda Emulator simulate a signal from a properly working Oxygen Sensor and sends this signal to the ECU. This prevents the "Check Engine" light from coming on when the vehicle is operating on CNG or LPG.



The Omnitek Emulator for Fuel Injectors



Emulator for Electronic Fuel Injectors Part #: B05FX

General



Install in an upright position far from any possible infiltration of water.



Install far from any sources of excessive heat (eg. exhaust manifold).



Install far from the ignition coil and pass the wiring far from the high voltage cables.



Make good electrical connections.

Never open the emulator box for any reason whatsoever.

Omnitek disclaims all liability for any damage or injury deriving from unauthorized personnel tampering with the device.

Please note

When running on gas the emulator blocks and simulates the injectors, while the electric petrol pump stays in operation. It is therefore important that there is always petrol in the tank to prevent the pump from overheating and getting damaged.

Technical specifications

The injector Emulator cuts out and simulates the operation of the injectors when the vehicle is running on GAS, thereby preventing the check-engine indicator light from coming on.

It is not necessary to check the polarity of the injectors because it cuts out and emulates each injector singly. In the event of system failure, the emulator automatically restores the original injector connection.

Overlap Time Adjustment

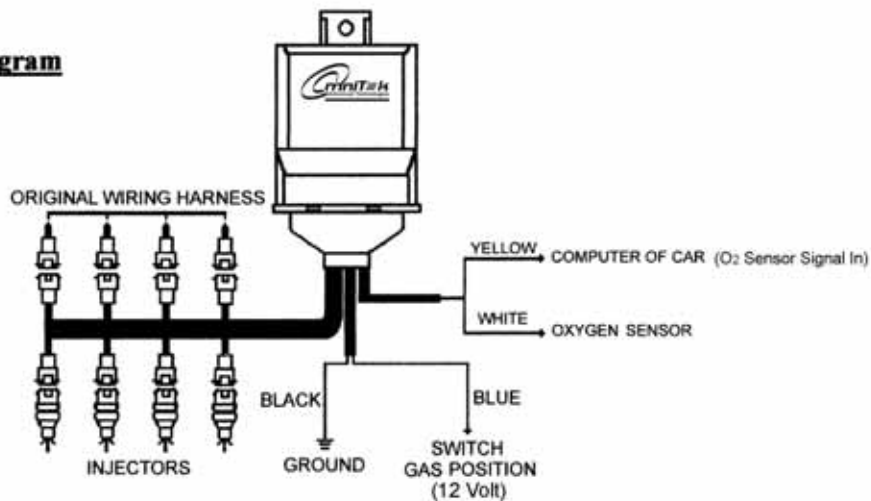


When switching over from petrol to gas, the emulator does not shut down injectors immediately; This is to give the gas time to reach the intake, avoiding backfiring.
 In this way, for a few seconds, there will be an overlap of the two fuels (petrol and gas) for a time that can be adjusted by means of the trimmer at the bottom of the emulator. The trimmer is calibrated in the testing phase so as to have an optimum overlap time. If the trimmer is turned anticlockwise to the left, the overlap time decreases turning it to the right increases the overlap time.

Emulating oxygen sensor signal

SWITCH 1	SWITCH 2	EMULATING SIGNAL OF OXYGEN SENSOR	REMARK
ON	OFF	SIGNAL OF SQUARE WAVE	FREQUENCY IS ADJUSTABLE. IT IS 1HZ WHEN FULLY ANTICLOCKWISE. THE FREQUENCY INCREASES CLOCKWISE.
X	ON	GROUND	X SHOWS SWITCH 1 COULD BE ANY POSITION.
OFF	OFF	OPEN - LOOP	DISCONNECTED OXYGEN SENSOR.

Wiring Diagram

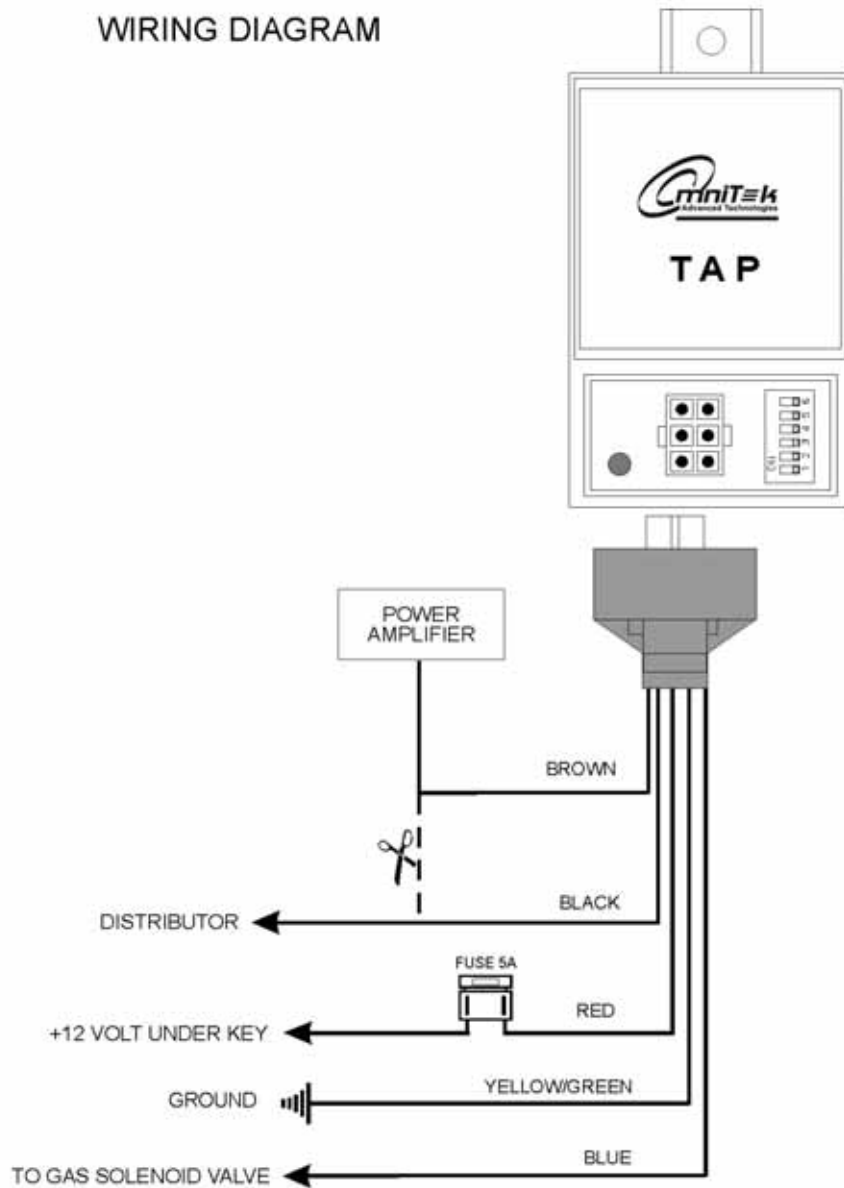


The Omnitek Timing Advance



TIMING ADVANCE PROCESSOR PHASE SENSOR TYPE

WIRING DIAGRAM



TIMING ADVANCE PROCESSOR PHASE SENSOR TYPE

FEATURES

The timing advance processor can be used on all electronic ignitions composed by a high tension rotary distributor and a power amplifier. The power amplifier is usually controlled by a square wave signal with amplitude from 0-5 Volts or 0-12 Volts. (pic.2)
 The timing advance processor must be connected on the square wave signal wire (see schem).

NOTE:

- For good functioning with C N G we suggest to set the advance from 7 to 9 degrees.
- The **LED** is on when advance processor is working.

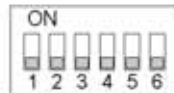
EMERGENCY

In case of malfunction of the timing advance processor, take off the wiring harness connector and replace it with the supplied emergency connector. (The original advance is reset)

WARNING

Never place the processor on coil negative.

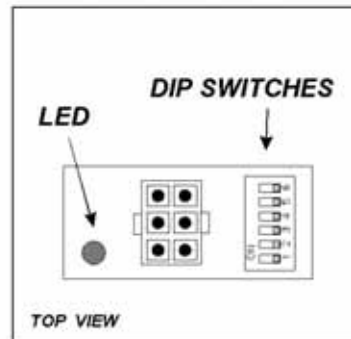
ADVANCE SELECTION TABLE



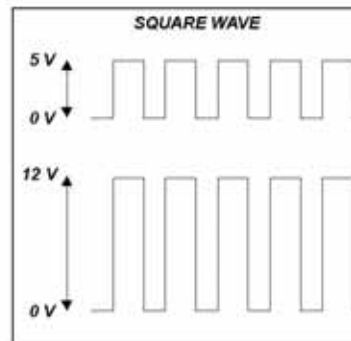
MICROSWITCHES POSITION:

- 1 "ON" = 1°
- 2 "ON" = 2°
- 3 "ON" = 4°
- 4 "ON" = 8°
- 5 "ON" WITH 5 VOLTS SIGNAL
 "OFF" WITH 12 VOLTS SIGNAL
- 6 "ON" WITH 6 CYLINDERS ENGINES
 "OFF" WITH 4 CYLINDERS ENGINES

NOTE: By switching on two or more microswitches, the advance degrees are added.
 example: 1 & 2 "ON" = 3°



Pic.1



Pic.2

Troubleshooting

- If the vehicle runs on gasoline and does not run on CNG

Check that it has fuel (CNG).

Check that the valves are open and that the manometer does not show “zero”.

Check that the conversion switch works properly.

Check that the electrovalve of the regulator works.

Check that the hose and the mixer are in running condition.

If it is an injection vehicle, check the operation of the electronic devices.

If it is an injection vehicle, check to see if the EPROM has been modified; contact the technical department.

- If the vehicle running on CNG has counter-explosion flame

Check the ignition system.

Check the good condition of the spark plugs.

Check cables and / or insulators; if necessary, replace all parts.

Use only original parts recommended by the vehicle’s manufacturer, unless the manufacturer of the regulator indicates specific changes.

- If the vehicle, while running, shows injection failure on the dashboard.

Check that the lambda gauge is compatible with the one in the vehicle.

Check the impedance of the injection emulator.

Check if the EPROM has been re-programmed; contact the manufacturer.

Inspections

It is advisable that gas equipment be inspected at least once a year and that the following are checked:

That there are no leaks in the joints.

That all valves close properly.

That the high-pressure piping installation and the cylinders have not been modified and continue securely in place.

That the ventilation system of the car has not been altered and continues being effective.

That the running of the gas system responds properly.



Recommendations to users

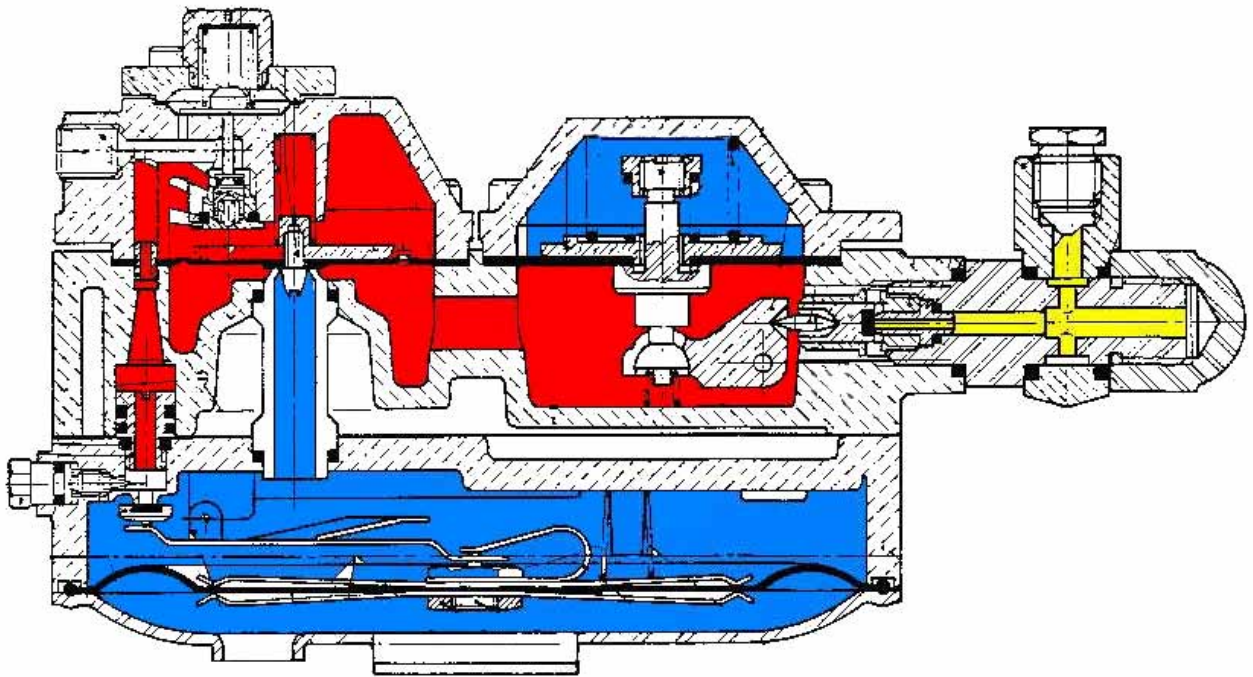
In case of traffic accidents.

Stop the vehicle and unload passengers. Check immediately for possible gas leaks and, should there be any, quickly close the valves of the cylinders. Do not activate any electric devices of vehicle, or smoke, or turn on the motor until you are absolutely sure that any accumulation of gases due to leaks or breakages in any part of the system has been properly ventilated. Should a fire break out, try to close the valves and attack the fire with an extinguisher. Evacuate all people from the area. If possible, keep the cylinders cold with abundant water. In all cases, remove vehicle from the road or street and notify the Fire and Police Departments.

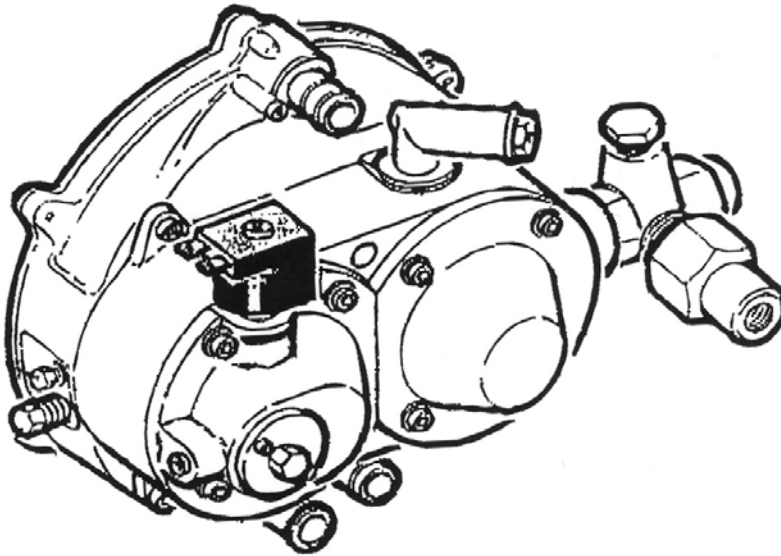
To load gas

The motor must be stopped and all electric equipment must be turned off, including the radio. Do not remain inside the vehicle.

CNG REDUCER REPAIR KIT



CNG REDUCER REPAIR KIT



Before starting please take following precautions: (fig. 60-61)

Check all rubber parts, replacing all that are worn.

Carefully check the high-pressure seat (B) and the relative sealing ring (A).

Position the ring (A) carefully in its slot.

Insert the seat (B) by pushing only by hand. Do not use any tools. Do not “pinching” the seal (A).

Screw the seat holder (C) in place.

Check that the sealing piston (D) slides freely in the seat holder (C).

Re-assemble the entire unit in the high-pressure body, taking the **UTMOST CARE** in positioning the spacer (E) Properly; before assembling the high-pressure diaphragm, make sure that the spacer is in the right position.

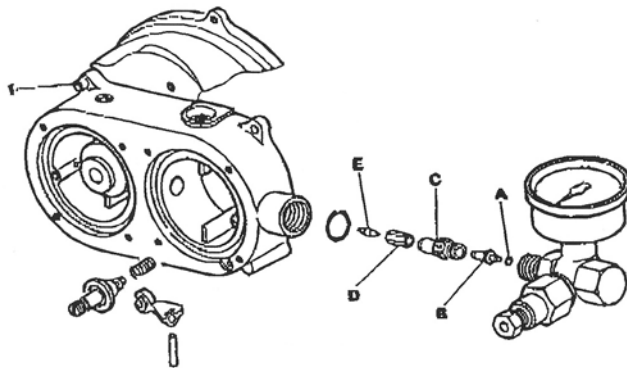


Fig. 60

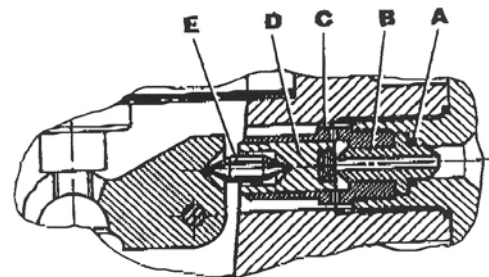
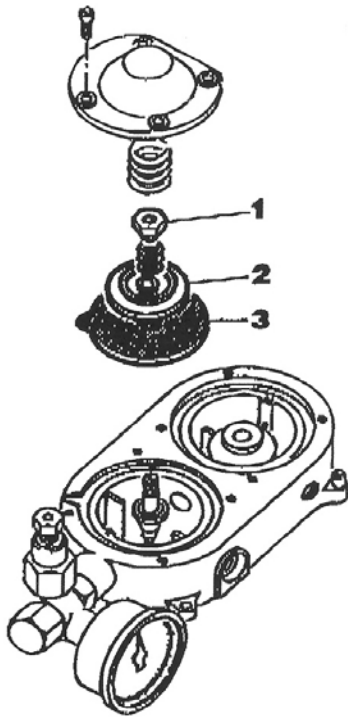


Fig. 61



When reassembling the cap (# 2 fig. 62), be careful with the diaphragm-centering ring (#2 fig. 62). The nut (# 1 fig.62) must be screwed without force until it touches the ledge on the stem.

Fig. 62

The diaphragm (# 1 fig. 63) must be secured to the plate (# 2 fig. 63) with the proper screw (# 3 fig 63) being careful not to force it.

Make sure that the diaphragm (# 1 fig. 63) is centered with respect to the sleeve (# 4 fig. 63) and aligned with the tube (# 5 fig 63), and the 2nd protection plate (# 6 – fig 63).

Replace o-ring on the solenoid piston (# 8 fig. 63). When reassembling the cap (# 7 fig. 63), make sure that the spring enters the guide properly.

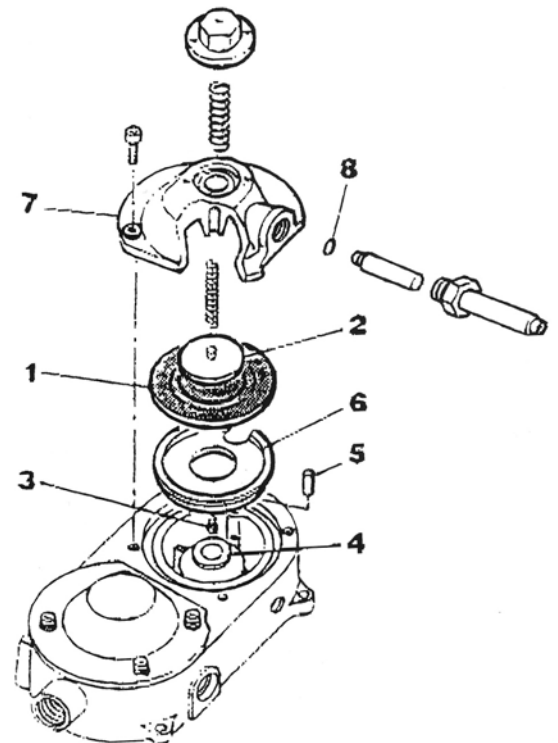


Fig 63

To reassemble the small low-pressure leaf spring use appropriate center square (# 1 fig. 66) which must be removed after having attached the screw (# 2 fig. 66).

Make sure the small leaf spring is perfectly centered and remains slightly separated (about 1 mm) from the slot, without bending the arm (#3 fig.66).

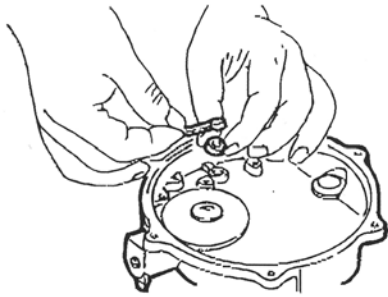


Fig. 65

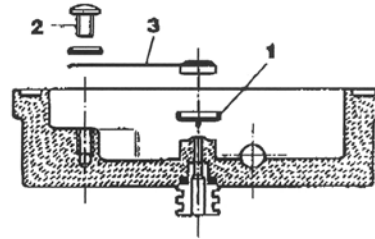


Fig. 66

Reassemble the lower pressure lever and then check the height as indicated.

If the appropriate gauges are not available comply with the measurements stated (fig. 67-68).

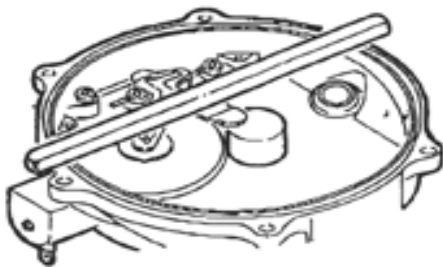


Fig. 67

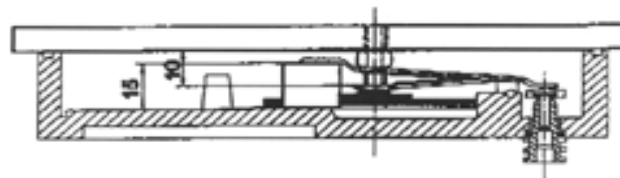


Fig. 68

To reassemble the low-pressure diaphragm, fasten it with the appropriate springs to the low-pressure lever, taking care not to place the curved part on the vacuum pump diaphragm.

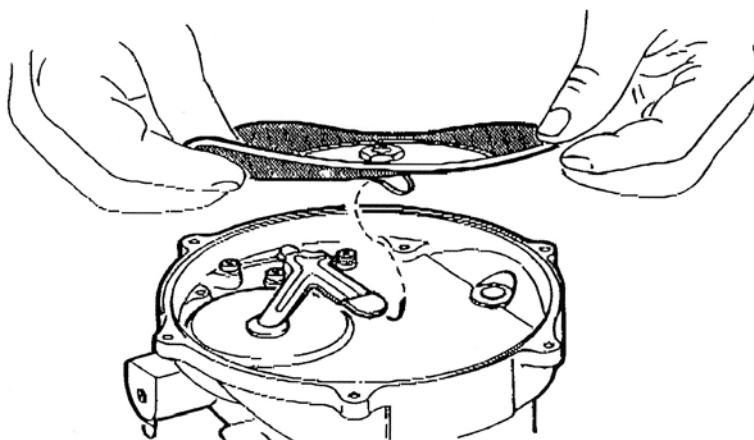


Fig. 69

Running Test

When the reducer has been completely overhauled and before installing it on the vehicle, it is necessary to test the equipment as follows:

Connect the solenoid valve to 12 Volt DC and tighten the supplementary idle setting screw.

Connect COMPRESSED AIR to the INLET fitting.

Check that the GAS JOINT is perfectly sealed using soap and water.

To make sure there are no leaks between the chambers, connect compressed air (max. 0.1 BAR) to the heating water inlet pipe, keeping the outlet pipe CLOSED.

Verify that there are no leaks anywhere using a soap and water.

