MANUALE DI INSTALLAZIONE



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COMPONENTISTICA PER IMPIANTI AUTOTRAZIONE GPL COMPONENTS FOR GAS MOTOR TRACTION SYSTEM







MARINI AUTOGAS

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# INSTRUCTIONS

# **BEFORE INSTALLING VERIFY:**



Ignition system (spark plugs/spark plug wires/coils)



Aspiration system (throttle body/carburetor and components)



Cooling system



Petrol Lambda probe (in catalyzed injection cars)



# INSTALLATION SCHEME







### CARBURETOR CARS (MODEL REFERENCE MARINI ASPIRATED REDUCER)

#### INSTALLING BACK PART:

To install the system, temporarily put the tank in the trunk of the car. Find the proper place to drill holes for the telescopic stand. Using a Ø 10mm bit, drill from inside the trunk to the bumper plate. Insert the provided restraining rings along the tank. Collocate the tank and on the outside of the bumper mount the washers and nuts provided with this product. Tighten with a n. 17 wrench or spanner. Cut the par of screw exceeding the nut. We suggest that you grease the stand's thread in order to make it easier in case you have to take it apart.

Drill, in the area behind the back seats in the trunk, two Ø 8mm holes to fasten the tank with straps, nuts and bolts provided with product and tighten securely.

Place the tank between the telescopic stand and the back seats; place the restraining belts over the tank; shorten the belts as needed to fix them to the straps on the telescopic stand. Hook the straps to the belts and put them through the telescopic ring.



Manually incline the tank; turning the tank's iron ring, inclination must be 30° (see Fig. 1) in the area in front of installer. Tighten all loose nuts and straps or belts with a n. 17 wrench. Make sure the tank does not have any room at all to move.



Carefully sand and smooth the tank's iron ring where the multi-valve's gaskin goes, to eliminate any kind of deposits or nicks which could cause a gas leakage.



On the outside of the iron ring insert the small O-Ring 174 included in the gas proof plastic box package; put the gas proof plastic box on the iron ring and rotate it so the gas tube inserts are horizontal, then insert the multi-valve.



Be very careful while inserting the multi-valve in the tank, since it is very delicate and easy to damage.

While rotating the multi-valve upwards from bottom to top, (see Fig. 2) insert the float inside the tank's opening, and then lightly flex the draft's filter. Once the multi-valve is inserted place the connectors in the gas



entrance and exit of the gas proof plastic box. In this position the multivalve quadrant is horizontal. Insert the M5 bolts furnished with this product, in the apposite holes on the multi-valve and tighten them cross wise (as you would changing a tire) with a n. 4 Alan wrench, so when you pressurize the tank to 10 bar, there are no leaks around where the multi-valve rests and the iron ring.

To allow ventilation in the trunk in case of gas leakage, you need to mount two Ø 30mm caged air outlets. To do this use a cutter and cut two opposite holes in the far bottom end of the trunk. Put the caged air outlets in the two holes and fix them using a Philips head screw driver and two self-tapping screws, be very careful in tightening the screws so you don't damage any wires which could be under the carpeting.

To prearrange the passage for the Ø 6mm and Ø 8mm LPG tubes, cut two holes side by side with Ø 30mm milling cutter inside the bottom of the trunk, near the fender. Put two open-air outlets in the holes and fix them using a Philips head screw driver and two self-tapping screws.

To mount the LPG filler intake push the Ø 8mm copper tube from the outside of the trunk towards the inside through one of the holes you just made as you do so use the flexible tube to cover it. Hook the tube to the gas proof plastic box. Do the same with the Ø 6mm copper tube and make it go under the car towards the front, along side the petrol tubes and fix it with clamps and self-tapping screws at least every 15 cm.

The beginning of the Ø 8mm copper tube needs to be connected to the hole on the bottom right hand of the multi-valve, before you insert the tube make sure you have inserted the bicone and the connector Ø 8mm furnished. Push the tube all the way inside the hole and make sure it is in all the way and tighten the connector, make sure that you push the tube in while tightening. Use wrench n. 14 and connect in the same way copper tube Ø 6mm.







The LPG filling valve can be put in different positions:

1. on the back (solution A) or on the side of the bumper (solution B) opposite of the exhaust pipe (see Fig. 3). With a  $\emptyset$  60mm milling cutter make a hole, sand the edges and insert the opposite box for filling valve, then the box for filling valve with lid. Pull the  $\emptyset$  8mm tube through the holes of these two boxes, fix the tube along the car with the copper pipe clips and self-tapping screws at least every 15 cm. Have the tube come out about 5 cm. from the box for filling valve with lid and cut off the protective covering. Insert the  $\emptyset$  8mm bicone and connector, connect the filling valve and fix it with a wrench n. 14. Make sure all the parts are in the right position and in their place, push and pull the filling valve box to make sure it is tight. Fix the filling valve to the box with a Philips head screwdriver using the self-tapping screws included in the kit.

2. in the trunk where the fuel filler is, if there is enough room, it is not in communication with the inside of the vehicle and it is easy to fill up with both. Verify the space available for the filling valve without modifying the homologated product. Drill a  $\emptyset$  20mm hole, put the filling valve inside and fix with the self-tapping screws included in the kit (solution C). To connect the tube  $\emptyset$  8mm follow the same instructions given above.



# INSTALLING THE FRONT PART.



POSITIONING THE REDUCER





As your first step, put the GPL reducer in the right position at least 150 mm from the exhaust pipe. In case you cannot maintain such a distance, you can change it to 75mm but you must put a metal plate between the conduct and the reducer. The reducer must be placed parallel to the cars longitudinal axel, with the reducer coil facing up so the oil discharge plug is facing down on the bottom part of the reducer (see Fig. 4 n. 1). We suggest you don't place the reducer higher than the water container to allow a



better cooling circulation. Use the reducer's brackets, bend them according to where you position them and with a Ø 8mm drill bit make the holes where you intend to fix the reducer to the car. To make it easier to adjust the reducer we suggest putting it as close as possible to the mixer.

The petrol's electro-valve has to be positioned as far away as possible from heat sources, trying to get as close as possible to the carburetor (see Fig. 4 n. 6). This is so you will have a better exchange between petrol and gas and in much less time since the distance between the tubes is so short. To fix it to the car, use a drill bit Ø 6mm and the brackets and self-tapping screws furnished with the kit. Put the electro-valve with the coil upward and the faucet in closed position (counter clockwise). Fix the electro-valve.

We suggest putting the GPL electro-valve with the coil upward near the reducer to obtain a fast exchange between gas and petrol. Make sure you put it away from heat sources (see Fig. 4 n. 3). To fix, drill a hole with bit Ø 6mm and fix with the screws in the kit.

According to the type of car, the mixer needs to be fixed between the filter and the carburettor body. Block the hot and cold air flux deviator, in position <sup>3</sup>/<sub>4</sub> cold <sup>1</sup>/<sub>4</sub> hot, with self-tapping screws in order to have a good carburetion.

Recuperate the Ø 6mm copper tube from the rear and bring it near the LPG electro-valve. Before fixing the electro-valve, rotate the tube around  $360^{\circ}$  at least twice in order to make two spirals with a diameter of about 5 cm. each this is to reinforce the tube against possible breakage do to vibrations. Do the same before fixing the reducer. At the end of copper tube Ø 6 Insert the connector and the bicone, carefully push the tube in the bottom hole and tighten with a n.13 wrench.

To connect the GPL electro-valve with the reducer, use enough copper tube  $\emptyset$  6mm which you will connect to the upper hole on the electro-valve and then another section to the reducer's gas entrance. Before fixing, insert the connector and bicone furnished with the kit and tighten with wrench n. 13.

*make sure the copper tube's hole is completely open.* 

With the  $\emptyset$  16mm tube furnished with the front case kit, connect the reducer's gas exit with the mixer fixing the ends with inox hose clamp. Cut the LPG tube in half and interrupt the LPG flux register furnished with the mixer kit, fixing the ends with a inox hose clamp (see Fig. 4 n. 2).

To create a depression in order to keep the car's idle stable, drill a Ø 5mm hole in the manifold possibly where the four manifolds meet, cut threads with 6x1 male. Insert brass vacuum connector Ø 1,3mm and connect the vacuum tube from the reducer to the manifold.

To install the petrol tube, disconnect the petrol's sending tube from the carburetor and insert it in the petrol electro-valve (entrance). With the



petrol tube enclosed in the front case kit connect the petrol electro-valve (exit) with the carburetor's entrance. If the carburetor has a fuel loop which connects the carburetor to the petrol pump, insert a no return valve at the end so that the two fuels don't mix. Fix all the ends with a inox hose clamp (pay attention to the mounting sense, the arrow is opposite of the carburetor).

Apply to the reducer the 90° curve furnished with the reducer set. Using the water tube furnished with the front case kit, connect the T-union for water with the curves, cut the tube to size. Fix ends with a inox hose clamp.

To heat the reducer we suggest to cut the car's two interior heating tubes (entrance and exit) and put the T-union for water enclosed. Orientate the sending tube downwards and the returning tube upwards; start the car and let all the air in the circuit out, through eventual discharge screws.

#### INSTALLING ELECTRICAL PART

Finished installing the mechanical part, you can start to insert the switch. Place the switch in the interior of the car; we suggest putting it near the fuse box since it will be easier to connect the wires to the motor area. Connect the switch wires to a probe and let it run through the hole that leads to the motor area.



#### Glossary:

- 1 Switch (NOTICE when on gas the color of the Led may vary from type to type)
- 2 Petrol Electrovalve
- 3 Spark plug coils
- 4 LPG Electrovalve
- 5 Reducer

Take the wires off the probe. All electrical connections have to be done with fastons and coverfastons.



Connect the blue wire to the LPG electro-valve's coil (see Fig. 5 n. 4). Connect the orange wire to the reducer's coil (blue color) (see Fig.5 n. 5).

The white wire has to be cut and isolated because not utilized.

Connect the yellow wire to the petrol electro-valve in the coil section (see Fig. 5 n. 2).

Connect the red wire to the coil's high voltage positive terminal clamp adding a 10AMP fuse (see Fig. 5 n. 3).

According to which kind of switch you are using, there could be other two wires a black and a brown. In this case, connect the black wire to the motor or car body mass, connect the brown wire to the coil's high voltage negative terminal clamp (rpm) (see Fig. 7).

# VERIFYING INSTALLATION:

Start the car and check if the reducer reaches a temperature of about 70° C. Check if there are any water or petrol leaks around the connections. Make sure you double-check everything, this is crucial.

With a hydraulic pump run the "hydraulic test" pressurize the system to 45atm in order to check for any possible leaks.

Go to a filling station and fill the tank; while the car is turned off check if when the tank is 80% full the multi-valve blocks any further LPG entrance (Ex. 100% = 50 lts. => 80% = 40 lts.).

With the help of a leak detector, check if there are any leaks around the connections. If you detect any leaks, check the connections and tighten them better.

Put the o-ring on the gas proof plastic box's lid then put the lid on.

Let the motor run until it reaches a temperature of 90° C making sure the cooling vent turns on. Put the switch in the middle and wait for the petrol to finish, put the switch on LPG then set the car's idle using the reducer's idle screw which is next to the coil. The car's rpm must stay constant around 700 and 900 and when you switch to petrol the rpms, while idling, must not go over 1000. If this does not occur, check the carburetor (see tests to run before installing). Accelerate and keep the rpms at 2500. Open the register maximum until you hear the rpms go up and reach the right amount.

Run a road test and check:

that the motor keeps it's idle when you stop and when there is a large amount of electrical disburse (illumination, air conditioner, cooling vent, etc).

That the motor keeps its rpm progression constant without skipping or jumping.

That the motor doesn't stop when decelerating while at high speed, in such a case, turn the air inlet so it isn't directly hit by the air.



# TROUBLE SHOOTING:

### Unstable idle:

make sure the vacuum tube has enough depression. If it doesn't find a better place.

Check the sensitiveness through the reducer's idle screw in order to find where the problem is (registro blocked, balancer, etc.).

Check if the motor has any estranged air intakes through the LPG system (ex: a hole in the battery coil ignition's depression tube).

### Insufficient power:

check if the mixer is installed correctly and is the proper one.

check that the register volante is regulated correctly.

check if that the mixer isn't causing motor problems while on petrol.

check if petrol is entering when you switch over to LPG. If this is the case,

check the petrol electro-valve's faucet and no return valve.

check the LPG electro-valve's filter inside its container.

check the air filter.

### Has problems starting when motor is cold:

Check the switch's coil efficiency when solicited by the switch.

Check that there is a minimum LPG flux exiting the reducer before starting the car.

Check the car's spark plugs and air filter.

### Reducer is frozen:

Check if the cooling system is in good condition (check radiator, manifolds, thermostat, etc.)

Check if the water connection was done correctly and if the liquid circulates without obstructions.

Check and see if there is air in the cooling system circuit. In this case eliminate air through the proper discharges.

### Filling problems:

check if the filling valve allows the LPG through.

Check if the multi-valve was mounted correctly or damaged while installing Check if there are any chokes along the Ø 8mm tube.

# Switch problems:

1. in the intermediate position the petrol doesn't finish

check if the petrol electro-valve's coil closes perfectly

check if the petrol electro-valve's faucet is closed

check that the yellow wire has a constant 12V charge when the switch is in petrol position.

2. the car does not switch to LPG: check if when you switch, the blue wire has a constant 12V charge



check if when you switch there is a passage of LPG between reducer and mixer.

### ADVISE AFTER ...... 1.000KM.

After the car has gone about 1.000 km on LPG we suggest to:

Check if all connections and tubes are tight.

Check carburetion and make all regulations to keep consumes to a minimum and the motor efficient.



#### INJECTION CAR.

(RIFERIMENTO AL MODELLO RIDUTTORE MARINI 88 AUTOMATIC)

### INSTALLING BACK PART:

Follow the same instructions for carburetor cars.

#### INSTALLING FRONT PART:

As your first step, put the GPL reducer in the right position at least 150 mm from the exhaust pipe. In case you cannot maintain such a distance, you can change it to 75mm but you must put a metal plate between the conduct and the reducer. The reducer must be placed parallel to the cars longitudinal axel, with the reducer coil facing up so the oil discharge plug is facing down on the bottom part of the reducer (see Fig. 4 n. 1). We suggest you don't place the reducer higher than the water container to allow a better cooling circulation. Use the reducer's brackets, bend them according to where you position them and with a  $\emptyset$  8mm drill bit make the holes where you intend to fix the reducer to the car. To make it easier to adjust the reducer we suggest putting it as close as possible to the mixer.

The petrol's electro-valve has to be positioned as far away as possible from heat sources, trying to get as close as possible to the carburetor (see Fig. 4 n. 6). This is so you will have a better exchange between petrol and gas and in much less time since the distance between the tubes is so short. To fix it to the car, use a drill bit Ø 6mm and the brackets and self-tapping screws furnished with the kit. Put the electro-valve with the coil upward and the faucet in closed position (counter clockwise). Fix the electro-valve.

We suggest putting the GPL electro-valve with the coil upward near the reducer to obtain a fast exchange between gas and petrol. Make sure you put it away from heat sources (see Fig. 4 n. 3). To fix, drill a hole with bit Ø 6mm and fix with the screws in the kit.

According to the type of car, the mixer needs to be fixed between the filter and the carburettor body. Block the hot and cold air flux deviator, in position <sup>3</sup>/<sub>4</sub> cold <sup>1</sup>/<sub>4</sub> hot, with self-tapping screws in order to have a good carburetion.

Recuperate the Ø 6mm copper tube from the rear and bring it near the LPG electro-valve. Before fixing the electro-valve, rotate the tube around  $360^{\circ}$  at least twice in order to make two spirals with a diameter of about 5 cm. each this is to reinforce the tube against possible breakage do to vibrations. Do the same before fixing the reducer. At the end of copper tube Ø 6 Insert the connector and the bicone, carefully push the tube in the bottom hole and tighten with a n.13 wrench.



*make sure the copper tube's hole is completely open.* 

To connect the LPG electro-valve with the reducer, use copper tube  $\emptyset$  6mm which you will connect to the upper hole on the electro-valve and another section to the reducer's LPG entrance. Before fixing insert the connector and bicone furnished with the kit and tighten with wrench n. 13.

With the Ø 16mm tube furnished with the front case kit, connect the reducer's LPG exit with the mixer fixing the ends with a inox hose clamp. Cut the LPG tube in half and interrupt the LPG flow register furnished with the mixer kit, fixing the ends with a inox hose clamp.

To heat the reducer we suggest to cut the car's two interior heating tubes (entrance and exit) and put the T-union for water enclosed.

Before fixing the 90° curve to the reducer, place the o-ring as shown in Fig. 6.



Apply to the reducer the 90° curve furnished with the reducer set. Using the water tube furnished with the front case kit, connect the T-union for water with curves, cut the tube to size. Fix ends with a inox hose clamp.

To heat the reducer we suggest to cut the car's two interior heating tubes (entrance and exit) and put the T-union for water enclosed. Orientate the sending tube downwards and the returning tube upwards; start the car and let all the air in the circuit out, through eventual discharge screws.





For the injection cars we suggest to install a switch which changes when you decelerate that according to the rpms you set, the change between gas and petrol is automatic.

Place the switch in the interior of the car; we suggest putting it near the fuse box since it will be easier to connect the wires to the motor area. Connect the switch wires to a probe and let it run through the hole that leads to the motor area.

Take wires off probe.

### **INJECTION MONO-INJECTION**:

To interrupt the injector's alimentation install the relay (AEB370) interrupting the positive of the mono-injector placed in the upper part of the body and connecting it to the relay mentioned. The connection has to be done with faston and coverfaston. Connect the blue wire, which comes from the switch, to the relay and the ground wire to the motor or the body of the car.

#### MULTIPOINT INJECTION:

We have two choices to interrupt the injection:

1. interrupt the positive that communicates with the four injectors using a relay (AEB370) as described above.

2. use the proper emulator according to the type of cars by-pass with appropriate wiring the injector plugs. Connect the blue wire from the emulator with the blue wire from the switch and the black wire to the motor or body of the car.



# THE ELECTRICAL CONNECTIONS OF THE SWITCH (see Fig. 7)

Connect the red wire to the existing 12V ignition (under key)

connect the blue wire from the switch to the positive pole of the LPG electro-valve then to the blue wire of eventual emulators.

Connect the brown wire to the negative pole of the rpm coil.

Connect the black to the motor ground or to the body of the car

The interruption of the injectors can be done by cutting the alimentation of the common positive and connecting the two extremities with the two yellow wires (connected inside to the C.G.E. to a relay) on the cars where the original CDU does not make a diagnose on the functioning of the injectors; in case of the contrary you need to install an adequate emulator for the type of car.

Also for the cars with homologation EURO4 it is necessary to install an emulator "OBDII  $\mu$ Fix".

The yellow wires not used to interrupt the injectors may be used to interrupt the check engine led or to reset the memory.

The green and white wires are to be use for the level indicator.

# VERIFYING INSTALLATION:

Start the car and check if the reducer reaches a temperature of 70° C. Check if there are any water or petrol leaks around the connections. Make sure you double-check everything, this is a critical part.

With a hydraulic pump run the "hydraulic test" pressurize the system to 45atm in order to check for any possible leaks.

Go to a gas station and fill the tank; while the car is turned off check if when the tank is 80% full the multi-valve blocks any further gas entrance.

With the help of a leak detector, check if there are any leaks around the connections. If there are any leaks check the connections and tighten them better.

Put the o-ring on the gas proof plastic box's lid then put the lid on.

Let the motor run until it reaches a temperature of 90° C making sure the cooling vent turns on. Put the switch in the middle and wait for the petrol to finish, put the switch on GPL then set the car's idle using the reducer's register minimo, which is next to the coil. The car's rpm must stay constant around 700 and 900 and when you switch to petrol the rpm must not be over 1000. If this does not occur, check the carburetor (see tests to run before installing). Accelerate and keep the rpms at 2500. Open register until you hear the rpms go up and reach the right amount.

# Run a road test and check:

that the motor keeps it's idle when you stop and when there is a large amount of electrical disburse (illumination, air conditioner, cooling vent, etc).



That the motor keeps the rpms progression constant without skipping or jumping, if this happens check the mixer.

That the motor doesn't stop when decelerating while at high speed, in such a case, turn the air inlet so it isn't directly hit by the air.

The MARINI 88 AUTOMATIC REDUCER has two registers to regulate the idle. One register is placed at the center of the reducer and is used to ad just the cars idle. The other is on the top of the reducer and is used to have an extra amount of fixed LPG to the motor, this second register is used only if necessary.

### TROUBLE SHOOTING

Unstable idle:

make sure the vacuum tube has enough depression. If it doesn't find a better place.

Check the sensitiveness through the reducer's idle screw in order to find where the problem is (registro blocked, balancer, etc.).

Check if the motor has any estranged air intakes through the LPG system (ex: a hole in the battery coil ignition's depression tube).

### Insufficient power:

check if the mixer is installed correctly and is the proper one.

check that the register volante is regulated correctly.

check if that the mixer isn't causing motor problems while on petrol.

check if petrol is entering when you switch over to LPG. If this is the case, check the petrol electro-valve's faucet and no return valve.

check the LPG electro-valve's filter inside its container.

check the air filter.

Has problems starting when motor is cold:

Check the switch's coil efficiency when solicited by the switch.

Check that there is a minimum LPG flux exiting the reducer before starting the car.

Check the car's spark plugs and air filter.

#### Reducer is frozen:

Check if the cooling system is in good condition (check radiator, manifolds, thermostat, etc.)

Check if the water connection was done correctly and if the liquid circulates without obstructions.

Check and see if there is air in the cooling system circuit. In this case eliminate air through the proper discharges.

#### Filling problems:

check if the filling valve allows the LPG through.

Check if the multi-valve was mounted correctly or damaged while installing Check if there are any chokes along the Ø 8mm tube.



Switch problems:

check if the switch's brown wire is connected correctly. In the case of insufficient signal, wrap the wire at least ten times around the high-tension wire or between the first and fourth cylinder the same amount of times and unite them.

make sure the rpms set on the switch aren't too high

check if the red wire is connected to the coil's positive and there is a current of 12V by using a multimeter or a lambda spy

check if the LPG electro-valve coil opens when you decelerate.

### ADVISE AFTER ...... 1.000KM.

After the car has gone about 1.000 km on GPL we suggest to:

Check if all connections and tubes are tight.

Check carburetion and make all regulations to keep consumes to a minimum and the motor efficient.



# CATALYSED INJECTION CARS (Dir. 94/12 and prior) Clean Gas Marini Exchange

To install the back, front and electrical parts, follow the same instructions as for the injection cars. Check the lambda probe functioning while running on petrol (see verifications prior to installation).

### INSTALLING THE CATALYTIC SYSTEM:

Place the catalytic CDU far away from humid parts and high temperatures. Install the actuator included in the catalytic kit along the gas tube preferably near the reducer with the regulating screw upward. Insert the wiring in the CDU.

### INSTALLING ELECTRICAL PART



#### Glossary:

- 1 CDU Clean Gas Marini
- 2 Stepper motor
- 3 Switch
- 4 Throttle position sensor (TPS)
- 5 Lambda probe

Connect the purple wire to the throttle position sensor (TPS) 4.

The TPS signal varies tension due to the function and the position of the accelerator from about 0.3V min. to 4.5V max. If you don't have the



electrical scheme for the specific car you can find the right wire using a multimeter while the CDU is inserted.

The white and brown wires are used for the car's lambda probe. Interrupt the probe's signal wire after the connector, which you can find with the multimeter, and connect the white wire to the section of wire coming from the lambda probe, then the brown wire to the one coming from the injection CDU.

Connect the black wire to the motor ground or to the body of the car.

Connect the blue wire to the switch's blue wire.

Connect the left over plug to the actuator.

### CARBURETING

Make sure the probe's emulation is right by using the micro-switches that are inside the CDU. Select standard emulation or single point emulation according to the type of injection.

To regulate the carburetion, connect the tester (cod. PEC201) with it's connector. Place the deviator in the "taratura sistema" position. Start the car. Switch to LPG. Register the maximums through the register above the actuator and the reducer's minimum, without considering the tester's results.

While the car is at minimum turn the trimmer inside the CDU so the TPS led is off while you are at minimum and ready to turn on as soon as you touch the accelerator.

Finish the adjustment with the tester; take the rpms to 3000, adjusting the actuator's register until the red led turns on. Take the rpm to the idle and register the reducer's idle screw until the tester's green led (lean) barley stays on and seems yellowish.

Place the tester in the "auto regola" position while the motor is at 3000 rpms and check that the leds keep on blinking.

Disconnect the tester and try the car on the road.



# CATALYSED INJECTION CARS (Dir.98/69 CE and prior) Clean Gas Evolution Exchange

To install the back, front the instructions are the same as for the injection cars. For the electrical part see scheme of Fig. 9.

### INSTALLING CATALYSTIC SYSTEM:

Place the catalytic CDU far away from humid parts and high temperatures.

### INSTALLING ELECTRICAL PART

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#### Note:

The interruption of the injectors can be done by cutting the alimentation of the common positive and connecting the two extremities with the two yellow wires (connected inside to the C.G.E. to a relay) on the cars where the original CDU does not make a diagnose on the functioning of the injectors; in case of the contrary you need to install an adequate emulator for the type of car.



Also for the cars with homologation EURO4 it is necessary to install an emulator "OBDI1  $\mu\text{Fix}".$ 

The yellow wires not used to interrupt the injectors may be used to interrupt the check engine led or to reset the memory.

### SYSTEM FUNCTIONING

Every time you start the car, the motor starts on petrol, the LPG and reducer electro-valves (9,10) are closed. In order to switch from PETROL to LPG you need to move the button on the switch (2), have the motor's rpms reach about 2.500 and letting go of the accelerator the injectors (4) automatically kick in and at the same time the LPG and reducer electro-valves (9,10) open. The LPG inside the tank (8) goes inside the reducer (10) where the pressure is lowered and through the mixer (12) due to the depression that is created in the aspiration manifolds it is sucked in and mixed with air inside the cylinders creating a perfect mix for combustion. The Marini CDU " C.G.E. " (1) elaborates the signals from the lambda probe (7) and the throttle position sensor TPS (15), manages the opening and closing of the "stepper motor" flux actuator (11) which manages the quantity of LPG aspirated from the motor, so to maintain no matter the condition the stechometric ratio functioning.

The connection of the CDU (1) to the battery is necessary since the CDU learns on its own and memorizes the right carburetion parameters. The tester to check the carburetion (3) can be connected to the CDU (1) to check the system's functioning.

### COMPUTERIZZED CHECKING EXCHANGE

The Marini "Clean Gas Evolution" CDU inside has a microprocessor which is programmed to check the signals from the lambda probe and the throttle position sensor (TPS) is able to pilot the stepper motor's flux actuator which manages the quantity of LPG aspirated from the motor, so to maintain no matter the condition the stechometric ratio functioning.

The setting of the carburetion is completely automatic since the CDU learns on its own, therefore it memorizes the right carburetion parameters and if necessary, according to the functioning conditions, it makes the corrections necessary and maintains the AIR/ LPG ratio correct.

The CDU, also has a plug to connect the tester to check the carburetion (only for installer use) in which you can see functioning parameters.

NOTE The Marini " Clean Gas Evolution " CDU works just the same for both LPG and CNG.





### "STEPPER MOTOR" FLUX ACTUATOR

The flux actuator, regulates the LPG flux aspirated by the motor maintaining the stechometric ratio AIR / LPG. The hole on which it works is calibrated so to have a correction as precise as possible.

NOTE the stepper motor flux actuator works just the same for both LPG and CNG.



- 1) Stepper motor.
- 2) The piston control shutter that can go from completely closed to completely open
- 3) Plastic body with a hole, which allows LPG flux.

### ELECTRICAL CONNECTION OF THE EOBDII AND OBDII µFix EMULATOR

The OBDII  $\mu$ Fix emulators are connected to the petrol injection CDU's communication bus, the car's lambda probe and to the LPG carburetion control CDU.

Notice:

In the same family, these emulators, are diverse only regarding the type of bus connection and the type of lambda probe signal, therefore they can be diverse according to the model of car.

The functioning strategy, on the contrary, is the same for all  $\mu\text{Fix}$  models.





### FUNCTIONING STRATEGY

The OBDII  $\mu$ Fix emulator while <u>functioning on LPG</u> is connected to the petrol CDU's diagnostic bus, it takes control of the lambda probe signal and sends the petrol computer an appropriate lambda probe signal.

At this point the car's original CDU no longer sees the original lambda probe signal, but the one generated by the OBDII  $\mu$ Fix emulator which is built in such a way to simulate the petrol's same behavior.

This prevents the diagnose warning light from turning on and maintains the proper petrol carburetion.

The connection to the diagnostic bus is used to find out how the carburetion is by asking the car's computer, if too rich or too lean, to correct the lambda signal in order to freeze the proper petrol carburetion.

<u>The OBDII µFix emulator while functioning with petrol</u> disconnects from the car's original communication bus and restores the original connection to the lambda probe.

This happens so the car's OBDII system is perfectly operative.

A malfunction noticed while functioning on petrol will be signaled by the warning light turning on and seen by the diagnostic display.

Note: For specific information regarding Clean Gas Evolution see product's manual.



