

F I A T B R A V O



L P G

This supplement is about the Fiat Bravo LPG version (Petrol-LPG).

For anything not included in this supplement, refer to the enclosed Owner Handbook.

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KNOWING YOUR CAR

INTRODUCTION

The LPG version of the car features two fuel systems, one for petrol and one for LPG.

Like the petrol system, the LPG system is timed, sequential multipoint type with special injectors.

WHAT IS LPG?

LPG (which stands for “liquefied petroleum gas”) is a gas mixture used as an economical and safe primary energy source.

Its main components are: propane gas and butane gas mixed in various proportions.

These gases are a product of petroleum refinement and are also present naturally in oil fields and methane-producing deposits.

In its natural state this mixture is in a gaseous state but, as the pressure increases at ambient temperature, it can easily be turned into a liquid state.

LPG is a fuel with a low environmental impact because it reduces the pollution produced by vehicle exhaust gases.

LPG MULTIPOINT INJECTION SYSTEM

This product is produced by working closely with qualified suppliers in the LPG sector. The injection system used on the car is an efficient system in terms of engine performance and is based on the injection of LPG in a gaseous state.

In this system with four injectors, one for each intake manifold, the fuel is injected directly into the engine heat transfer ducts, thereby metering the LPG very precisely. This improves combustion and, at the same time, excludes any possibility of back-draught.

By adapting the electronic control technology of petrol engines to meet the specifications of LPG, it has been possible to achieve significant results in terms of driveability and controlling exhaust emissions.

Engines running on LPG have almost the same torque/power specifications as when running on petrol and, as a result, the performance of the car is also comparable.



The system operates at temperatures are between -20°C and 100°C .

SELECTING THE TYPE OF FUEL SUPPLY

The car is configured for running independently on either petrol or LPG.

The engine is always started on petrol with an automatic shift to LPG after about 40 seconds at the first significant acceleration.

This is the time required to reach optimum conditions (engine coolant temperature, minimum revs level) for the switch to LPG. **Therefore, there must always be some petrol in the tank (at least 1/4 full)** in order not to compromise the operation of the fuel pump.

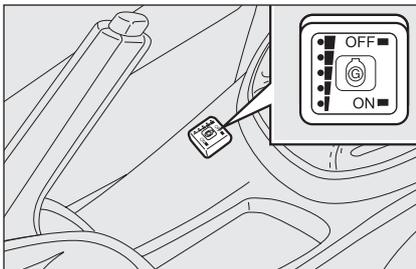


fig. 1

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In addition, it is advisable to periodically use up the petrol in the tank (until the reserve warning light comes on) in order to ensure that the petrol does not become old and possibly deteriorate.

The petrol/LPG switch **fig. 1**, located on the central tunnel (next to the gear lever) allows the driver to select petrol or LPG operation as they see fit.



When running on LPG, when the last red LED on the gas gauge (visible on the switch) comes on, refuelling is advisable. If the LPG runs out when in LPG mode, the system automatically switches to petrol mode. This is indicated by: the amber LED staying on and the green LED flashing, the fuel level LEDs going out and an audio signal from the switch.



*Remember that, once LPG refuelling is complete, it is necessary to switch again by pressing the button **fig. 1** to run the car on gas.*



The LPG supply system is equipped with a “consumption” function linked to the LED display of LPG level on the switch; this function activates only after a consistent variation in fuel level has been detected. You are therefore advised to fill up with fuel at the first LPG refuelling to obtain a more precise indication of the “level”.

PASSIVE SAFETY/ACTIVE SAFETY

Passive safety

The car has the same passive safety specifications as other versions. In particular, the cylinder mountings (located in the spare wheel housing) have been designed to exceed the Fiat safety standards for impact tests.

When running on LPG, the flow of gas (in a liquid state) leaving the cylinder passes through the dedicated pipe to the pressure regulator where there is a safety solenoid valve that stops the flow of LPG when the key is removed or when a change of fuel is selected by the driver (decision to run on petrol).

Together with the regulator solenoid valve, a second solenoid valve, in the tank, closes the LPG pipe at the tank outlet.

The two solenoid valves are closed in the case of an impact after the engine is switched off by the fuel cut-off system.

The LPG tank complies with the national standards in force in countries where the version illustrated in this supplement is sold.



IMPORTANT

It should be pointed out that in some countries (including Italy) there are legal restrictions in force for parking/garaging motor vehicles with gas that has a higher density than air; LPG comes under this category.



The car is equipped with a gaseous LPG injection system designed specifically for it: it is therefore absolutely forbidden to alter the configuration of the system or its components. The use of other components or materials could cause malfunctions and lead to a reduction in safety. Therefore, in the case of problems, go to a Fiat Dealership. To prevent damage to the LPG system parts when towing or raising the car, follow the instructions in the "Towing the car" chapter of the Owner Handbook.



When painting in an oven, the LPG tank should be removed from the car and later carefully refitted by a Fiat Dealership. Although the LPG system has numerous safety features, it is advisable to close the manual tap on the tank every time the car is not in use for a long period, transported on other vehicles or moved in an emergency as a result of a breakdown or accident.

SYSTEM FUNCTIONAL DIAGRAM

DESCRIPTION OF THE SYSTEM FUNCTIONAL DIAGRAM fig. 2

1 LPG tank – 2 Multivalve unit and safety devices – 3 LPG refuelling cap – 4 LPG piping 5 Pressure regulator – 6 LPG injectors – 7 Gaseous LPG filter element – 8 LPG injection system electronic control unit – 9 LPG-petrol switch and LPG gauge – 10 Petrol tank.

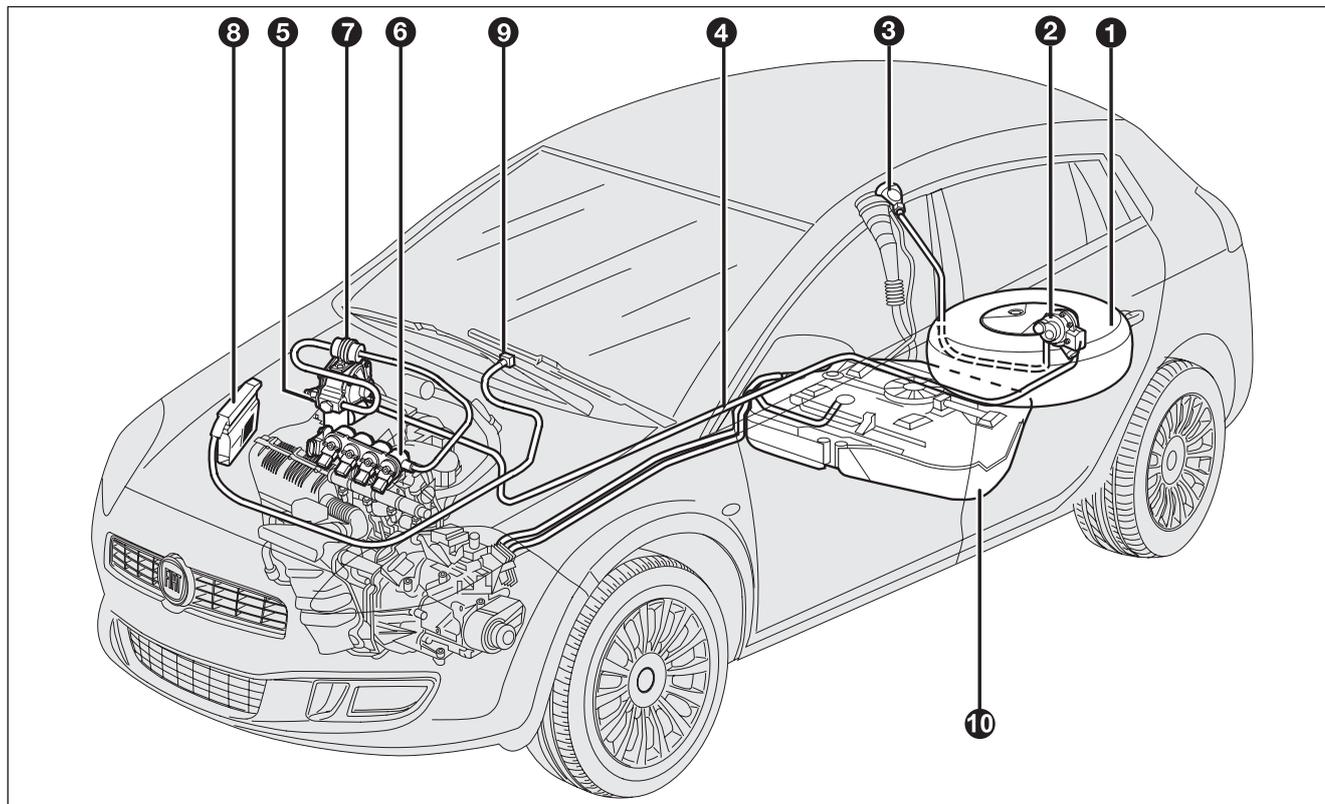


fig. 2

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LPG TANK

The car has a (pressurised) tank **A**-fig. 3 for collecting LPG in a liquid state. It is ring-shaped and located in the spare wheel compartment with suitable protection.

The LPG in the tank **A** is always in a liquid and gaseous state, in physical equilibrium conditions.

The liquid, which cannot be compressed, dilates by around 0.25 % for each increase in temperature of one degree. For this reason there is a suitable space allowing for the increase in volume of the liquid for all foreseeable temperature increases (e.g. car parked in the full sunlight in the summer) without compromising the integrity of the tank.

There is a safety valve that automatically limits the refilling of the tank (during refuelling) to a maximum level of 80 % (liquid) of its total capacity.



Periodically (at least once every six months), it is advisable to let the LPG in the tank run out and, at the next refuelling, check that it does not exceed the maximum capacity of 41 litres (with a tolerance of 2 litres excess) (see instructions in the “Capacities” paragraph of this supplement). If the value is above 41 litres (with a tolerance of 2 litres excess), contact a Fiat Dealership immediately.

LPG TANK CERTIFICATION

The LPG tank is certified in accordance with the regulations in force.

In Italy, the tank has a life of 10 years from the registration date of the car. If the car has been registered in a country other than Italy, the duration and the testing/inspection procedures of the LPG tank can vary depending on the legal requirements in that country. In any case, after the time prescribed by the legal requirements in the individual countries, have it replaced by a Fiat Dealership.

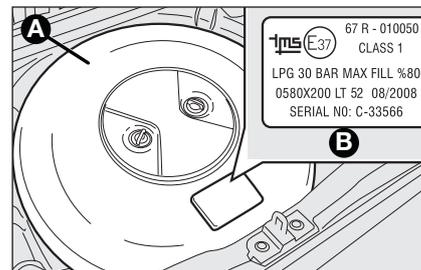


fig. 3

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There is a plate on the tank **B**-fig. 3 containing the following information:

- homologation country identification and homologation number;
- type of gas for which it is designed (LPG);
- name of cylinder manufacturer;
- cylinder test pressure (30 bar);
- maximum refilling percentage (80%);
- tank dimensions;
- nominal tank capacity in litres;
- cylinder manufacture date (month/year);
- cylinder serial number.

SOLENOID VALVES AND SAFETY DEVICES

The system has a solenoid valve located on the pressure reduction unit and a solenoid valve fitted inside the multiple valve assembly on the tank.

The main function of these solenoid valves is to interrupt/allow the flow of LPG to the supply circuit.

The solenoid valves are open when:

- a request to run on LPG has been made;
- the optimum engine running conditions are satisfied (engine coolant temperature, minimum revs level) for running on LPG;
- there is enough LPG in the tank for operation.

The multivalve assembly fitted on the tank includes:

- a valve that automatically stops the supply of LPG when the maximum permitted filling level is reached (80% of the total tank capacity);
- a flow limiter which, if a pipe is broken, prevents the complete and sudden escape of LPG;
- a one-way valve, located on the gas return pipe in the tank, which prevents LPG reflux;
- a safety solenoid valve on the LPG supply which, either permits or prevents the escape of gas to the pressure reduction unit;

– a manual tap, upstream of the solenoid valve, that separates the tank from the LPG system to allow maintenance operations;

– a fuse pad which, in the event of overheating (temperature above 120 °C), totally eliminates the danger of excess pressure by making the LPG in the tank flow out as quickly as possible in a controlled manner;

– an analogue gauge showing the level of LPG in the tank.

PIPING

The piping for the LPG in a liquid state (from the filler to the tank and from the tank to the pressure regulator) is made from copper and coated in plastic.

The piping for the LPG in a gaseous state (from the pressure regulator to the LPG injectors) is made from rubber.

REGULATION UNIT

The regulation unit **fig. 4** includes:

- cut out solenoid valve with gauze filter;
- pressure regulator.

The cut out solenoid valve opens or closes together with the solenoid valve on the tank. It closes all flows of LPG when the engine is not running on gas.

It also acts as a safety device that prevents the flow of LPG if the fuel cut-off system intervenes.

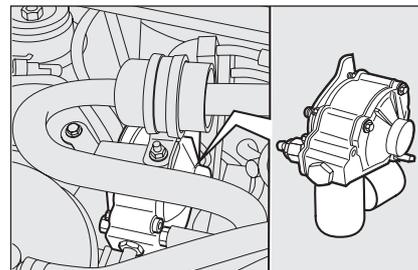


fig. 4

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The pressure regulator allows the change of the LPG from a liquid state to a gaseous state through an expansion chamber and maintains the pressure required for the operation of the system at a preset value.

PAPER FILTER

The filter **fig. 5**, located on the pressure regulator outlet pipe, has the task of filtering the LPG in a gaseous state during the LPG injectors supply stage.

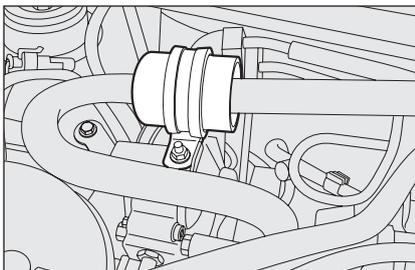


fig. 5

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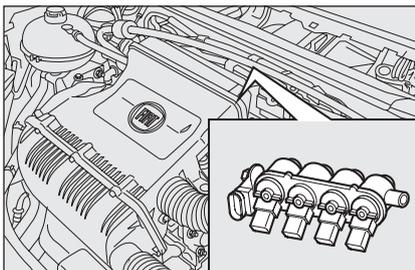


fig. 6

FOQ0812m

LPG INJECTORS

There are four injectors **fig. 6**, specially designed for LPG, mounted on a special bracket on the cylinder head and connected, by means of dedicated pipes, to the individual intake ducts; they are supplied with LPG in a gaseous state at a constant pressure and are operated by a dedicated electronic control unit.

A gas pressure and temperature sensor mounted on the injectors sends an electrical signal to determine the LPG injection time.

ELECTRONIC CONTROL UNIT

The car has a dedicated electronic control unit for the LPG system **fig. 7**; it uses the incoming signals from the petrol injection control unit and converts them into signals for the injection of the LPG.

The control unit for the injectors has the same strategy as the petrol control unit (timed, sequential, multipoint).

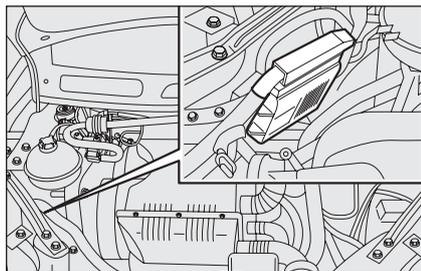


fig. 7

F0Q0813m

LPG/PETROL SWITCH

The LPG/petrol switch **fig. 8** is located on the central console near the handbrake and includes:

A. LPG/petrol operating mode request button;

B. LPG gauge: 5 LEDs (4 green and 1 red to indicate the reserve). The red LED only comes on when the last green LED goes out.

The red LED indicates the reserve status;

ON. LPG operating mode indicator: green LED on continuously, located under button **A**;

OFF. petrol operating mode indicator: amber LED on continuously, located above button **A**.

IMPORTANT When the ignition key is turned to the **MAR – ON** position, the LEDs on the switch come on as follows:

– with petrol operation mode selected: amber **OFF** LED on;

– with LPG operation mode selected: all LEDs on the switch are on continuously and the green **ON** LED flashes.

To select the type of fuel system desired (LPG or petrol), press button **A-fig. 8**.

To change the type of fuel system, it is advisable to operate the button with the car stationary and the engine running or, while

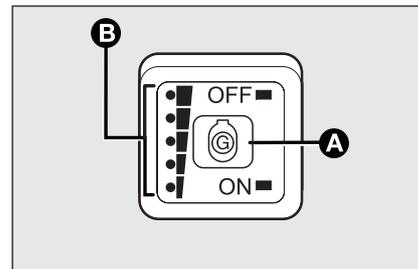


fig. 8

F0Q0805m

st driving, after having released the accelerator.

If switching takes place during acceleration or pick-up, there may be a brief flat spot (drop in power).

Do not switch between the two operating modes when starting the engine.

SWITCHING FROM PETROL TO LPG

With petrol fuel supply: press the button **A-fig.8**, the switch to LPG will take place automatically at the first significant acceleration.

During switching:

- the LPG gauge **B** comes on;
- the amber **OFF** LED goes out (petrol operating mode);
- the green **ON** LED comes on, switching from intermittent to on constantly (LPG operating mode);

There are 5 LEDs **B** (1 red and 4 green) on the left of the switch that display the amount of LPG in the tank.

When the amount of LPG remaining goes below about 1/5 of the capacity of the tank, only the red (reserve) LED remains on to signal the need for refuelling.

IMPORTANT When starting up at outside temperatures of below -10°C , the switching times from petrol to LPG increase to allow the pressure regulator to heat up.

Switching from LPG to petrol

With LPG supply: press the button **A-fig.8**.

During switching:

- the LPG gauge **B** goes out;
- the amber **OFF** LED comes on and stays on (petrol operating mode);
- the green **ON** LED goes out (LPG operating mode).

Running out of LPG

If the LPG runs out, switching to petrol takes place automatically with:

- the amber **OFF** LED on constantly;
- the green **ON** LED flashing;
- an acoustic signal from the switch (high frequency).

IMPORTANT The acoustic signal warns the driver that the engine is running on petrol; therefore, they must refuel with LPG before it runs out.

THE acoustic signal can be deactivated by pressing the switching button **A**.



Do not switch between the two operating modes whilst starting the engine.

SYSTEM FAILURE SIGNALLING

The car has a self-diagnosis system capable of signalling any malfunctions in the LPG fuel system through the green **ON LED** **fig. 8** flashing. In the case of faults that could affect the correct operation of the engine, the LPG control unit will automatically switch from LPG operation to petrol.

This condition will be shown by:

- the amber **OFF** LED on constantly;
- the green **ON** LED flashing;
- an acoustic signal from the switch (low frequency).



In this situation, you can continue driving, with the car running on petrol (excluding the LPG fuel system). To turn off the acoustic signal, press button A: the green ON LED will go out and the amber OFF LED will remain on constantly. Go to a Fiat Dealership as soon as possible to have the system checked.

FUEL CUT-OFF SYSTEM

In the event of an impact to the car, the petrol and injection supply is cut off immediately, causing the engine to cut out and, as a result, the LPG safety solenoid valves to close.

For further information, see the “Fuel cut-off system” paragraph in the “Controls” chapter in the Owner Handbook.

STARTING THE ENGINE

The engine is always started on petrol even with the switch in the LPG position (green LED flashing, amber LED on constantly), and switches from petrol to LPG automatically soon after.

There must therefore always be some petrol in the tank to protect the petrol pump.

To carry out the starting manoeuvre correctly, see the warnings and advice in the “Starting the engine” chapter of the Owner Handbook.

REFUELLING THE CAR

LPG FILLER CAP

The gas filler is located next to the petrol filler cap. It has a one-way valve, located in the actual filler body.

To access the filler **B**-fig. 9, open the access flap **A** and undo the cap **C**.

Observe the following precautions during the refuelling operation:

- switch off the engine;
- apply the handbrake;
- turn the ignition key to the **STOP** position;
- do not smoke;
- hand the special adapter over to the qualified LPG refuelling personnel.

IMPORTANT Before refuelling, the LPG refuelling personnel must ensure that the adapter is correctly fitted to the filler.

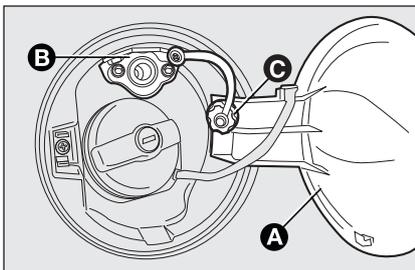


fig. 9

F0Q0807m

IMPORTANT Different types of fuel pump adapters exist in the various countries where the car is sold. The adapter that comes with the car in a special case is specifically designed for the country in which the car is sold. If you are in a different country, find out what type of adapter is used there.

IMPORTANT Only use LPG for motor vehicles.

IMPORTANT Look after the LPG adapter carefully so that it does not get damaged.

WHEELS

The car does not have a spare wheel but a tool box **fig. 11** that contains the “Automatic Fix&Go” quick tyre repair kit, a tow ring and a screwdriver. The box is located in the boot **fig. 10**, behind the rear seat backrest.

To use the “Automatic Fix&Go” kit, see the instructions in the Owner Handbook that accompanies this supplement.

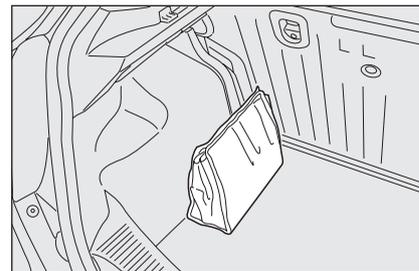


fig. 10

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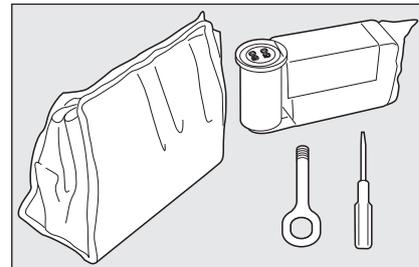


fig. 11

F0Q0814m

REPLACING FUSES

The LPG system components are protected by specific fuses. Contact a Fiat Dealership if a fuse needs replacing.

For all the other fuses, consult the Owner Handbook that accompanies this supplement.

SCHEDULED SERVICING PLAN

Additional operations to the Servicing Plan in the Owner Handbook.

Thousands of kilometres	30	60	90	120	150	180
Visual check on conditions: LPG piping and connectors and LPG tank fastening	●	●	●	●	●	●
Replacement of filter inside the pressure regulator			●			●
Paper filter replacement (LPG in gaseous state)	●	●	●	●	●	●
Check operation and parameters of fuel supply system using self-diagnosis socket	●	●	●	●	●	●

ENGINE

ENGINE CODE – BODYWORK VERSIONS

	Engine code	Bodywork version
1.4 16V	192B2000	198AXA1B G00C

IDENTIFICATION PLATE (STAGE 2)

Following the installation of the LPG system components, a plate (Stage 2) is fitted to the engine compartment front crossmember. It contains the following information:

- Name of manufacturer;
- Homologation number (Stage 2);
- Vehicle type identification codes;
- Vehicle weights;
- Engine type;
- Bodywork version code.

GENERAL FEATURES

		1.4 16V	
Engine identification code		192B2000	
Cycle		Otto	
Number and layout of cylinders		4 in line	
Piston bore and stroke	mm	72 × 80.4	
Total displacement	cc	1368	
Compression ratio		11	
		LPG	Petrol
EEC max. power	kW	66	66
	hp	90	90
at a speed of	rpm	5500	5500
EEC max. torque	Nm	128	128
	kgm	13	13
at a speed of	rpm	4500	4500
Spark plugs		NGK DCPR7E-N-10	
Fuel		LPG	Unleaded petrol 95 RON

LPG FUEL SYSTEM

Electronic injection with special LPG injectors.

Type: timed sequential Multipoint.

Stoichiometric metering of the air/gas mixture.

Engine idle speed:
750 \pm 50 rpm

The LPG injection system is controlled by a dedicated control unit (connected to the petrol unit) using the sensors already on the car.

IGNITION

Static advance, electronic, integrated with the injection.



IMPORTANT

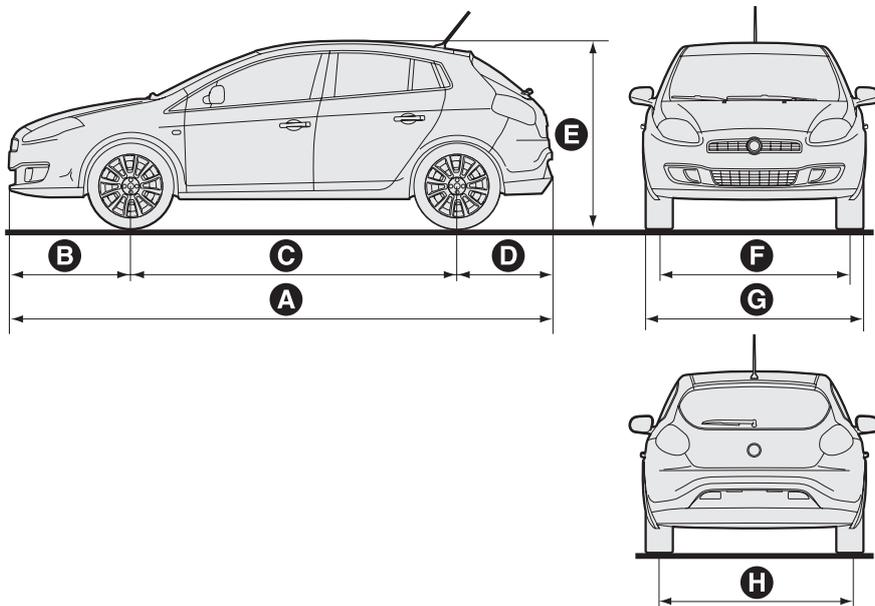
Modifications or repairs to the fuel feed system that are not carried out properly or do not take the system technical specifications into account can cause malfunctions leading to a risk of fire.

WEIGHTS

Weights (kg)	1.4 16V
Unladen weight (with all fluids, fuel tank filled to 90% and without optional equipment):	1205
Payload including the driver (1):	510
Maximum permitted loads (2)	
– front axle:	1000
– rear axle:	860
– total:	1715
Towable loads	
– braked trailer:	1000
– unbraked trailer:	500
Maximum permitted load on the roof (3):	80
Maximum load on the ball joint (braked trailer):	60

- (1) If special equipment is fitted (sun roof, tow hook, etc.) the unladen weight increases, thus reducing the payload in relation to the maximum permitted loads.
- (2) Loads that must not be exceeded. The user is responsible for arranging goods in the luggage compartment and/or load carrying platform within the maximum permitted loads.
- (3) Lineaccessori Fiat range roof rack bars, maximum capacity: 50 kg.

DIMENSIONS



Dimensions are expressed in mm and refer to the car fitted with its original tyres. Height is measured with the car unladen.

Boot capacity

Capacity with car unladen (VDA standards): 365 dm³

Capacity with rear seat backrest folded over: 1139 dm³

fig. 10

F0Q003m

A	B	C	D	E	F	G	H
4336	974	2600	762	1498	1538 1530 (●)	1792	1532 1524 (●)

Minor variations in size are possible depending on the dimensions of the wheels.

(●) with optional 18" alloy wheels

CAPACITIES

Petrol

Petrol litres 57

– including a reserve of ... litres 8÷10

LPG

– maximum refuelling capacity (*) litres 41

(*) The figure already takes into account the 80% tank filling limit and the residual fluid required for the pump and the maximum permitted capacity. **In addition, said figure may vary slightly in different capacities owing to: differences between network pump supply pressures, pumps with different supply/stop specifications, tank not completely in reserve conditions.**

It should be remembered that when using a fuel like LPG, the range is very variable because, in addition to the driving and maintenance conditions of the car, it also depends on the different composition of the gas which may vary, not only seasonally, but also from supplier to supplier. LPG is, in effect, a composition of gas (butane and propane) mixed in a way that may not be standardized.

The Trip Computer's range is indicative and refers to petrol operation only.

During LPG operation, the "Instant consumption" and "Average consumption" readings are not significant, but all other functions remain valid.

IMPORTANT Only use LPG for motor vehicles.



The LPG supply system is equipped with a "consumption" function linked to the LED display of LPG level on the switch; this function activates only after a consistent variation in fuel level has been detected. You are therefore advised to fill up with fuel at the first LPG refuelling to obtain a more precise indication of the level



If, when refuelling with LPG, the tank is filled with more than 41 litres (with a tolerance of 2 litres in excess), seek assistance immediately from a Fiat Dealership. Periodically (at least once every six months), it is advisable to let the LPG in the tank run out and, at the first refuelling, check that it does not exceed the maximum capacity.

Engine cooling system

Mixture of 50% demineralised water and 50% PARAFLU^{UP} litres 6.3

NOTE In particularly harsh climate conditions, a mixture of 60% PARAFLU^{UP} and 40% demineralised water is recommended.

FLUIDS AND LUBRICANTS

PRODUCT SPECIFICATIONS

Use	Quality specifications of fluids and lubricants for correct car operation	Original fluids and lubricants	Replacement interval
Lubricants for petrol/LPG engines	SAE 5W-40 ACEA C3 grade wholly synthetic lubricant. FIAT 9.55535-T2 certification.	SELENIA MULTIPOWER GAS 5W-40 Contractual Technical Reference No. F603.C07	According to annual maintenance and inspection schedule

For petrol engines running on LPG, we recommend using the original product formulated specifically for this type of use.

The use of products with specifications below ACEA C3 – SAE 5W-40 could cause damage to the engine not covered by the warranty.

FUEL CONSUMPTION

The fuel consumption figures given in the table below are determined on the basis of the homologation tests set down by specific European Directives.

FUEL CONSUMPTION ACCORDING TO THE CURRENT EUROPEAN DIRECTIVE (litres/100 km)

	Petrol	LPG
Urban	8.6	10.6
Extra-urban	5.5	7.0
Combined	6.7	8.3

The range (when running on LPG), referring to combined consumption, is 494 km.

CO₂ EMISSIONS

The CO₂ emission figures refer to combined consumption.

CO₂ EMISSIONS ACCORDING TO THE CURRENT EUROPEAN DIRECTIVE

LPG: 134 g/km

Petrol: 156 g/km

