BRC
GAS EQUIPMENT

Samba

Asia

Brio

- installer's handbook -

CONTENTS
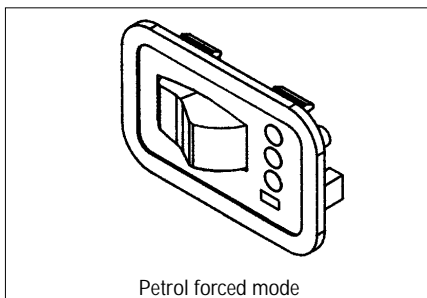
code 06LB00001240

1. PRESENTATION

Destined to the injection vehicles, Samba is a changeover ECU for gas systems based on a microcontroller that can be built-in on the dashboard.

2. ECU FUNCTIONS

It fulfils the following functions: changeover, gas level gauging and safety indication.

2.1. CHANGEOVER FUNCTIONS
### 2.1.1. PETROL FORCED MODE

Petrol forced mode

With the switch in its **"Petrol forced"** position, the vehicle can regularly run on petrol as if there was no gas equipment fitted. The TWO-COLOUR LED turns red (orange when the rpm are beyond the changeover threshold), the gas solenoid valves are closed and the contact for the petrol injector cut is closed (petrol injectors are working).

2.1.2. PETROL-GAS AUTOMATIC CHANGEOVER MODE

With the switch in its central position **"Automatic changeover"** (**recommended position for powering the vehicle by gas**), the vehicle starts up on petrol, and

changes over to gas if a given rpm threshold is exceeded and there is


Commutazione automatica
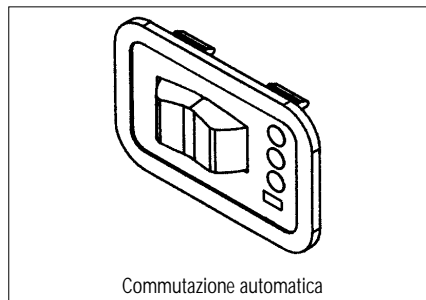
a subsequent rpm drop (deceleration condition).

It is possible to calibrate the fuel overlapping time while changing over (par. 3).

With the engine running on petrol the TWO-COLOUR LED turns red (blinking in absence of rpm and fixed in presence of rpm), orange when the given changeover threshold is exceeded and fixed green after changing over to gas.

2.1.3. GAS FORCED MODE
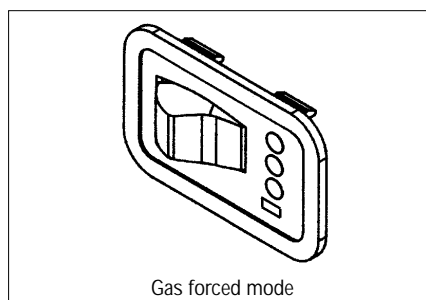
Gas forced mode

With the switch in its **"Gas forced"** position, the engine only runs on gas. The TWO-COLOUR LED turns fixed green during the "starter" function (opening of the solenoid valves for a certain lapse of time, to enable the direct starting on gas), then blinking green waiting for the engine start-up and fixed green again with the engine started.

This is to be considered as an **emergency solution**, only to be used in the event of faulty operation of the petrol supply or of starting failure.

2.2. LEVEL GAUGING

The Samba ECU is devised for the gas level gauging function,

through the connection to the BRC level sensor of the resistive type (0-90 ohm). Beside the changeover button and above the TWO-COLOUR LED there is a level gauge consisting of a high-brilliance three-GREEN LED bar (ECU front view: fig.1).

Three GREEN LEDs lit mean that the tank is full, while the first below GREEN LED flashing means that it is in reserve.

The level indicator is pre-calibrated but it is possible to calibrate the thresholds to adapt them to the equipment fitted (par. 3).

2.3. TROUBLESHOOTING

The Samba ECU is able to make a diagnosis of its working in real time and to trace errors or faulty operations on the GREEN LEDs of the changeover switch.

In particular, in the event of the engine being turned off accidentally, even with the key contact connected, the ECU closes the gas solenoid valves to prevent any gas leakage ("safety" function) and notifies the accidental cut-out through a shifting GREEN LED lit.

3. ECU CALIBRATION

The Samba ECU enables to freely define parameters such as the control of the tank level and the changeover, by selecting proper calibration ranges from the switch.

The changeover rpm threshold can be adjusted from a trimmer.

3.1. ACCESS TO THE CALIBRATION DOMAIN

To accede to the calibration domain it is necessary to follow the below process:

- changeover switch in its central position;
- switch the instrument board on;
- verify that the TWO-COLOUR LED turns blinking red;

- make three transitions from the petrol to the central position during six seconds (approx. one second for each shifting of the switch), with the changeover switch in its central position after the last transition;

- the third GREEN LED (ECU front view: fig.1) blinking means the access to the first calibration domain (the TWO-COLOUR LED is switched off if the minimum level calibration has never been made, whereas it is blinking green if the calibration has been made at least once);

- this way we enter the 1st calibration domain (minimum tank level).

3.2. CALIBRATION DOMAINS

The various calibration domains are in the following order.

| 1. minimum tank level | 2. maximum tank level |

| 3. fuel overlapping time | 4. parameter set-up |
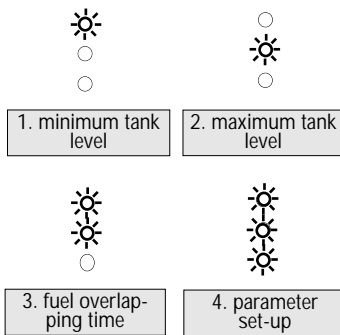
The GREEN LEDs are blinking during calibration. The TWO-COLOUR LED has the following meanings:

- switched off: calibration domain never calibrated;

- blinking green: calibration domain parameter already calibrated;

- fixed green: while memorising data.

IMPORTANT:

- You can pass from a calibration domain to another one by changing over from the central to the gas position.

- At every passage the changeover switch should be in its central position to memorise the corresponding parameter.

3.3. MEMORISATION OF CALIBRATION PARAMETERS

1st domain: minimum tank level calibration

With the tank empty and the switch in its petrol position (TWO-COLOUR LED is fixed green) the value has been acquired and the changeover switch can be in its central position (TWO-COLOUR LED is blinking green).

It is not possible to acquire a minimum level value higher than the maximum level value.

2nd domain: maximum tank level calibration (4/4)

With the tank full (4/4) and the changeover switch in its petrol position (TWO-COLOUR is fixed green) the value has been acquired and the changeover switch can be in its central position (TWO-COLOUR LED is blinking green).

It is not possible to acquire a maximum level value lower than the minimum level value.

3rd domain: fuel overlapping time calibration

With the changeover switch in its petrol position, the GREEN LEDs show the current overlapping time for 3 seconds, according to the following encoding:

- GREEN LEDs turned off: no overlapping

- first GREEN LED: 3/10 of second

- second GREEN LED: 6/10 of second

- third GREEN LED: 9/10 of second

After 3 seconds, the level LEDs start shifting, following the encoding indicated above in a cyclic way and the TWO-COLOUR LED turns fixed green (acquisition of a new value). When the LED showing the given overlapping time is lit, the changeover switch should be in its central position again to acquire

this value. The blinking green TWO-COLOUR LED shows the correct acquisition of the new value.

The default calibration is 6/10 of second (second GREEN LED).

4th domain: parameter set-up

This domain is used to reset the ECU default parameters.

With the switch in its petrol position, wait approx. 5 seconds: the 3 fixed GREEN LEDs mean that the default values have been reset.

IMPORTANT

After every calibration operation it is necessary to switch off and on the panel.

3.4. CALIBRATION OF CHANGEOVER RPM THRESHOLD

The Samba ECU is calibrated to have a changeover threshold of approx. 2000 rpm (with a standard ignition system).

Should this value be modified, it is convenient to turn the proper trimmer positioned behind the GREEN LEDs completely clockwise.

To set the changeover threshold it is necessary to have the switch in its petrol position (fixed red TWO-COLOUR LED), start the engine, fix the rpm for changing over and turn the trimmer very slowly anti-clockwise (always at steady rpm), until the TWO-COLOUR LED turns from red to orange.

IMPORTANT

Turning the trimmer anti-clockwise the changeover threshold is decreased, whereas turning it clockwise the changeover threshold is increased.
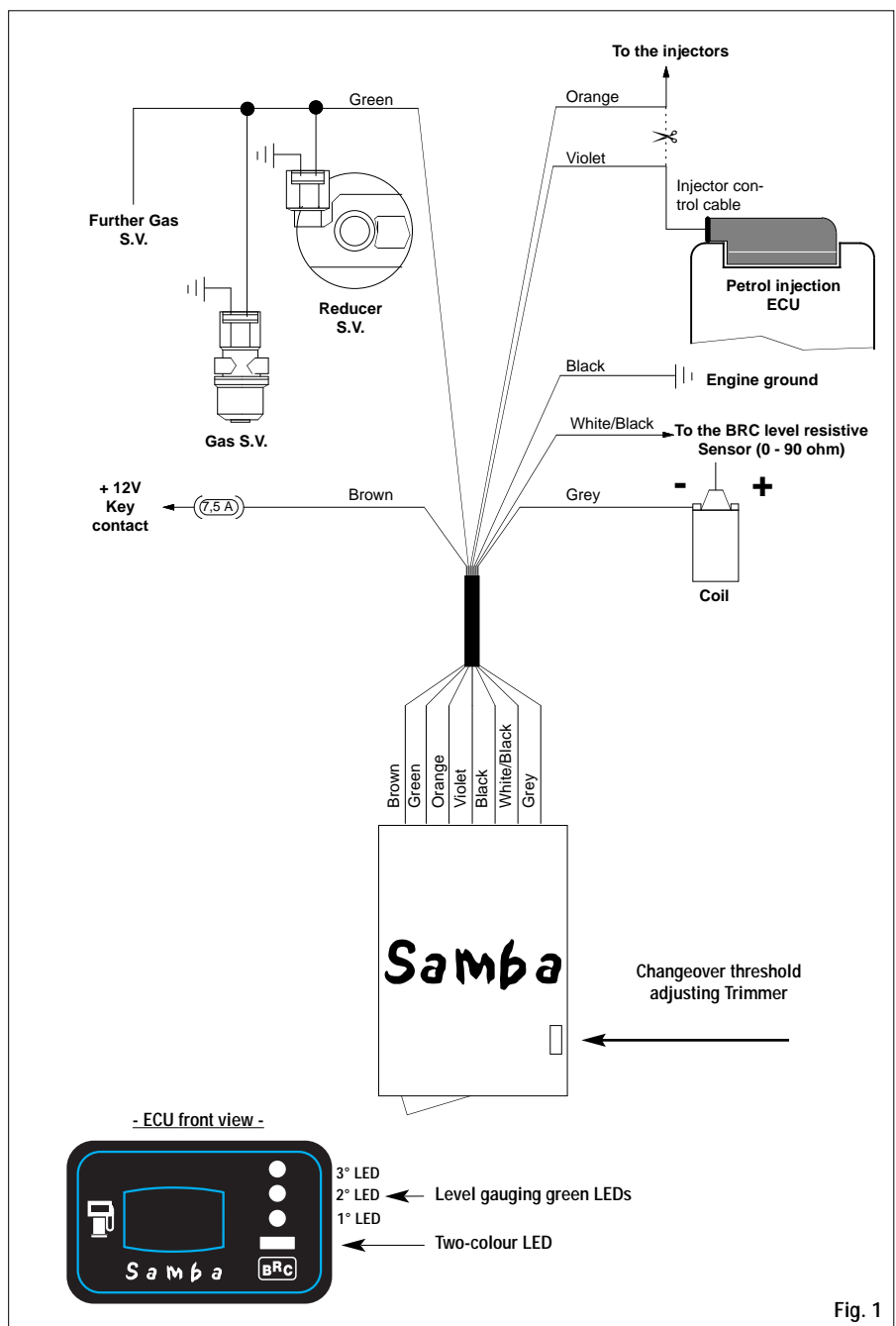
4. ELECTRICAL CONNECTIONS

CABLE COLOUR	CONNECTION
BROWN	POSITIVE KEY CONTACT
BLACK	ENGINE GROUND
GREY	IGNITION IMPULSES
GREEN	GAS SOLENOID VALVES
ORANGE	INJECTOR SUPPLY IN
VIOLET	INJECTOR SUPPLY OUT
WHITE/BLACK	TANK LEVEL

NOTE:

The grey wire can be indifferently connected to:

- the ignition coil negative;

- the square wave signals available between the ignition ECU and the corresponding power module (provided that they have sufficient amplitude) or direct to the revolution counter.

Do not twist the wire as an antenna on the high voltage cables.

WARNING

Never allow the petrol tank to become empty so as to avoid dry-running the pump. It is necessary to maintain a petrol quantity corresponding to 1/4 or 1/2 of the tank at all times and to renew it periodically.

M.T.M. S.r.l. declines all responsibility for any improper installation or use of this product that may cause serious injury and/or property damage.

Fig. 1

Asia
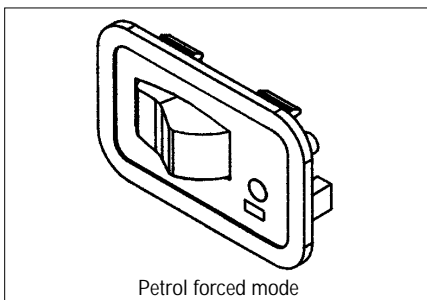
code 06LB00001271

1. PRESENTATION

Destined to the injection vehicles, Asia is a changeover ECU for gas systems that can be built-in directly on the dashboard.

2. ECU FUNCTIONS

It fulfils the following functions: changeover control and gas reserve indication.

2.1. CHANGEOVER FUNCTIONS

2.1.1. PETROL FORCED MODE

Petrol forced mode

With the switch in its **"Petrol forced"** the gas solenoid valves are closed and the vehicle can regularly run on petrol as if there was no gas system fitted.

The TWO-COLOUR LED turns red if the rpm are below the changeover threshold, whereas it turns orange as soon as the rpm are beyond the given threshold.

2.1.2. PETROL-GAS AUTOMATIC CHANGEOVER MODE

With the switch in its central position **"Automatic changeover"** (**position recommended for powering the vehicle on gas**), the vehicle starts up on petrol and automatically switches to gas when the changeover condition is satis-

fied: rpm beyond the given threshold.

Automatic changeover
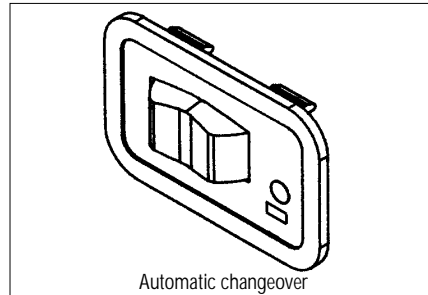
While the engine runs on petrol the TWO-COLOUR LED turns red, then orange when the given changeover threshold is exceeded, and fixed green (gas solenoid valves are open) after changing over to gas.

The gas solenoid valves are automatically disconnected in the event of the engine being turned off accidentally ("safety").

2.1.3. GAS FORCED MODE
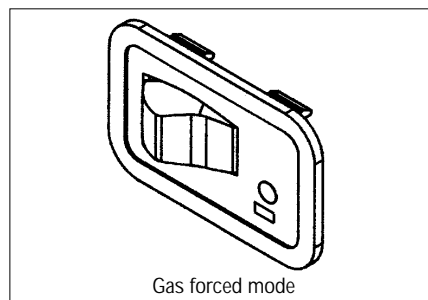
Gas forced mode

With the switch in its **"Gas forced" position**, the engine only runs on gas. The TWO-COLOUR LED is red if there is only the key contact whereas it turns fixed green (opening of the gas solenoid valves) as soon as the ECU recognises a rpm signal.

The gas solenoid valves are automatically disconnected in the event of the engine being turned off accidentally ("safety").

This is to be considered as an **emergency solution**, only to be used in the event of faulty operation of the petrol supply or of starting failure.

2.2. LOW FUEL INDICATION

The Asia ECU is devised for the low fuel warning function, through the connection to the BRC reserve

sensor. Beside the changeover button and above the TWO-COLOUR LED there is actually a high-brilliance red LED that turns on in reserve conditions (ECU front view: fig.2).

3. CALIBRATION OF CHANGEOVER RPM THRESHOLD

The Asia ECU is calibrated to have a changeover threshold of approx. 2000 rpm (with a standard ignition system).

Should this value be modified, it is convenient to turn the proper trimmer positioned behind the RED LED completely clockwise.

To configure a changeover threshold it is necessary to have the switch in its petrol position (fixed red TWO-COLOUR LED), start the engine, fix the rpm for changing over and turn the trimmer anticlockwise very slowly (always at steady rpm), until the TWO-COLOUR LED turns from red to orange.

NOTE

Turning the trimmer anti-clockwise the changeover threshold is decreased, whereas turning it clockwise the changeover threshold is increased.
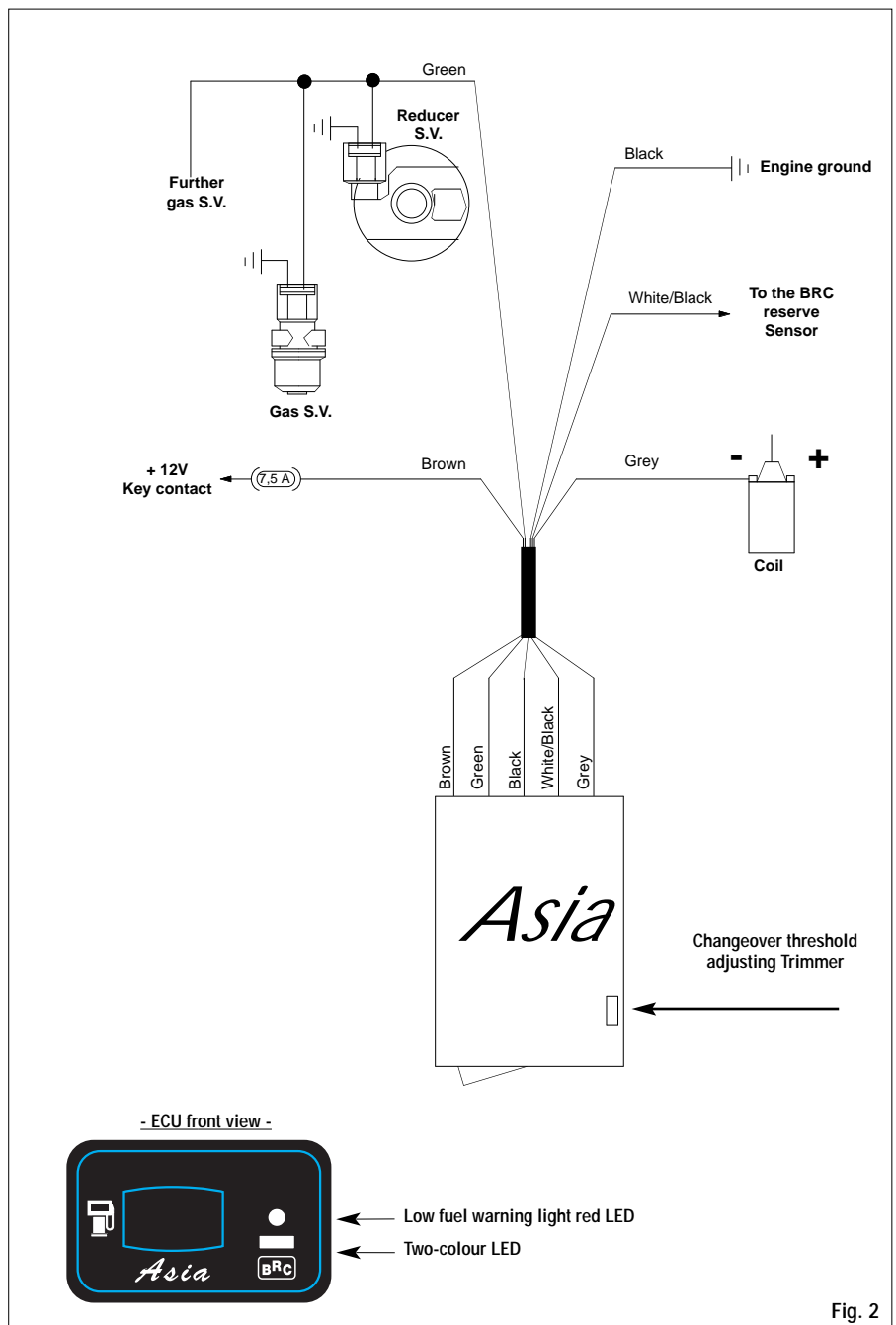
4. ELECTRICAL CONNECTIONS

CABLE COLOUR	CONNECTION
BROWN	POSITIVE KEY CONTACT
BLACK	ENGINE GROUND
GREY	IGNITION IMPULSES
GREEN	GAS SOLENOID VALVES
WHITE/BLACK	TANK LEVEL

NOTE:

The grey wire can be indifferently connected to:

- the ignition coil negative;

- the square wave signals available between the ignition ECU and the corresponding power module (provided that they have sufficient amplitude) or direct to the revolution counter.

Do not twist the wire as an antenna on the high voltage cables.

Fig. 2

WARNING

Never allow the petrol tank to become empty so as to avoid dry-running the pump. It is necessary to maintain a petrol quantity corresponding to 1/4 or 1/2 of the tank at all times and to renew it periodically.

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Brio

code 06LB00001260 version with complete indication

code 06LB00001261 version with low fuel warning light

1. PRESENTATION

Destined to the carburettor vehicles, Brio is a changeover ECU for gas systems that can be built-in directly on the dashboard.
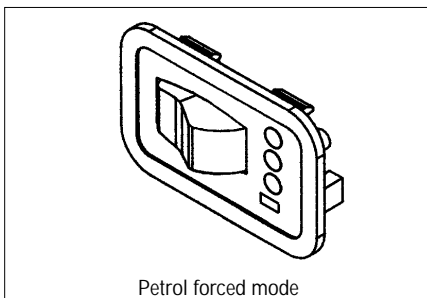
2. ECU FUNCTIONS

It fulfils the following functions: changeover and gas level indication.

There are two versions of the Brio ECU: one with the complete level indication (code 06LB00001260) and the other with low fuel indication (code 06LB00001261).

2.1. CHANGEOVER FUNCTIONS

2.1.1. PETROL FORCED MODE

Petrol forced mode

With the changeover switch in its **"Petrol forced"** position, the vehicle can regularly run on petrol as if there was no gas system fitted. The TWO-COLOUR LED turns red, the gas solenoid valves are closed and the petrol solenoid valve control is enabled (petrol entering the carburettor).

2.1.2. PETROL-GAS CHANGEOVER MODE (CUP EMPTYING)
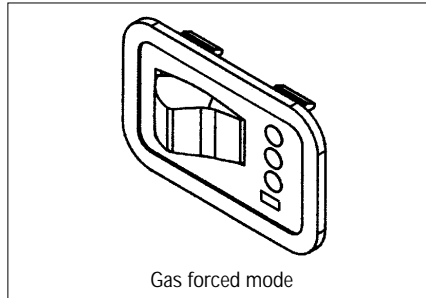
Brio offers the possibility to switch from petrol to gas with no flooding because, with the switch in
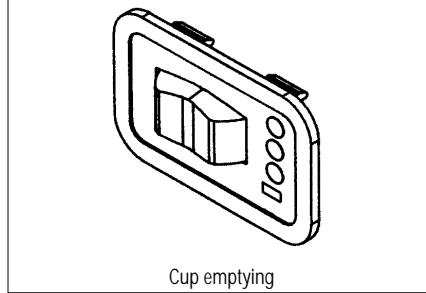
Cup emptying

its central position (TWO-COLOUR LED turned off) the petrol solenoid valve and the gas solenoid valves are closed. With the carburettor emptied, it will be sufficient to have the switch in its **"Gas forced"** position (green TWO-COLOUR LED).

2.1.3. GAS FORCED MODE

Gas forced mode

Activating only the key contact with the switch in its gas position, for some seconds, the gas solenoid valves will be opened and the TWO-COLOUR LED will turn green and then off (priming is over). This is aimed at automatically supplying the "starter" to favour start-up.

By starting up the engine later the gas solenoid valves will open, the TWO-COLOUR LED will turn green and the gas solenoid valves will be active until the vehicle is turned off. The gas solenoid valves are also automatically disconnected in the event of the engine being turned off accidentally ("safety").

2.1.4. GAS-PETROL CHANGEOVER MODE

Brio offers the possibility to switch from gas to petrol. With the switch in its central position (TWO-COLOUR LED is turned off) the gas solenoid valves and the petrol solenoid valve are closed.

To switch it is therefore neces-sary to have immediately the changeover switch from its gas position to its petrol position without stopping in its central position. The vehicle will regularly run on petrol (red TWO-COLOUR LED).

2.2. LEVEL INDICATION
2.2.1 VERSION WITH COMPLETE INDICATION
CODE 06LB00001260

The Brio ECU is devised for the gas level gauging function, through the connection to the BRC level sensor of the resistive type (0-90 ohm).

Beside the changeover button and above the TWO-COLOUR LED there is a level gauge consisting of a high-brilliance three-GREEN LED bar.

Three GREEN LEDs lit mean that the tank is full, while the first below GREEN LED flashing means that it is in reserve.

2.2.2 VERSION WITH LOW FUEL INDICATION
CODE 06LB00001261

The Brio ECU is devised for the low fuel warning function, through the connection to the BRC reserve sensor. Beside the changeover button and above the TWO-COLOUR LED there is actually a high-brilliance red LED that turns on in reserve conditions.
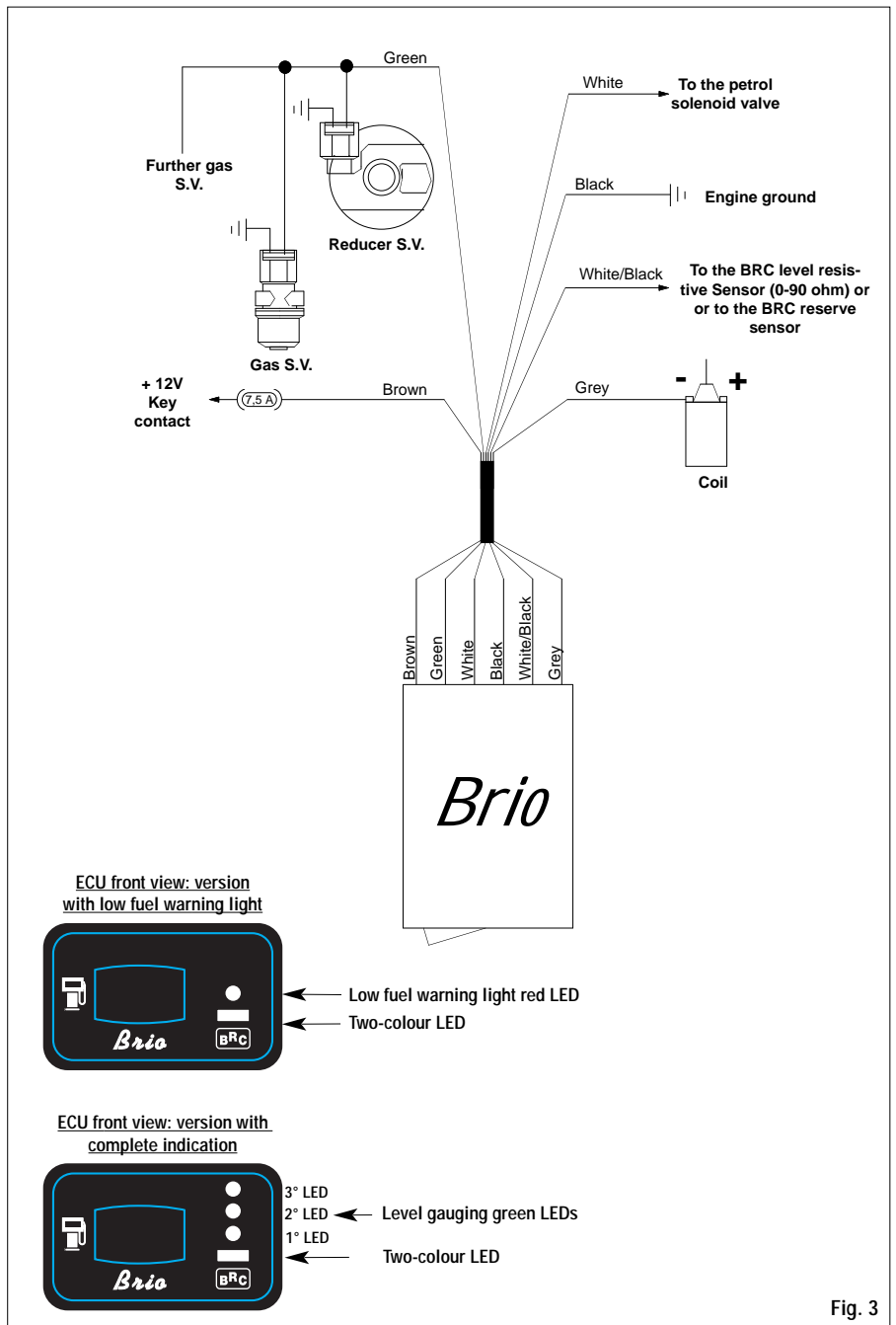
4. ELECTRICAL CONNECTIONS

CABLE COLOUR	CONNECTION
BROWN	POSITIVE KEY CONTACT
BLACK	ENGINE GROUND
GREY	IGNITION IMPULSES
GREEN	GAS SOLENOID VALVES
WHITE	PETROL SOLENOID VALVE
WHITE/BLACK	TANK LEVEL/RESERVE

NOTE:

The grey wire can be indifferently connected to:

- the ignition coil negative;

- the square wave signals available between the ignition ECU and the corresponding power module (provided that they have sufficient amplitude) or direct to the revolution counter;

- twisted with some turns around high voltage cables.

Fig. 3