SGI VERSUS SYSTEM USERS MANUAL 10.2012

CONTENT:

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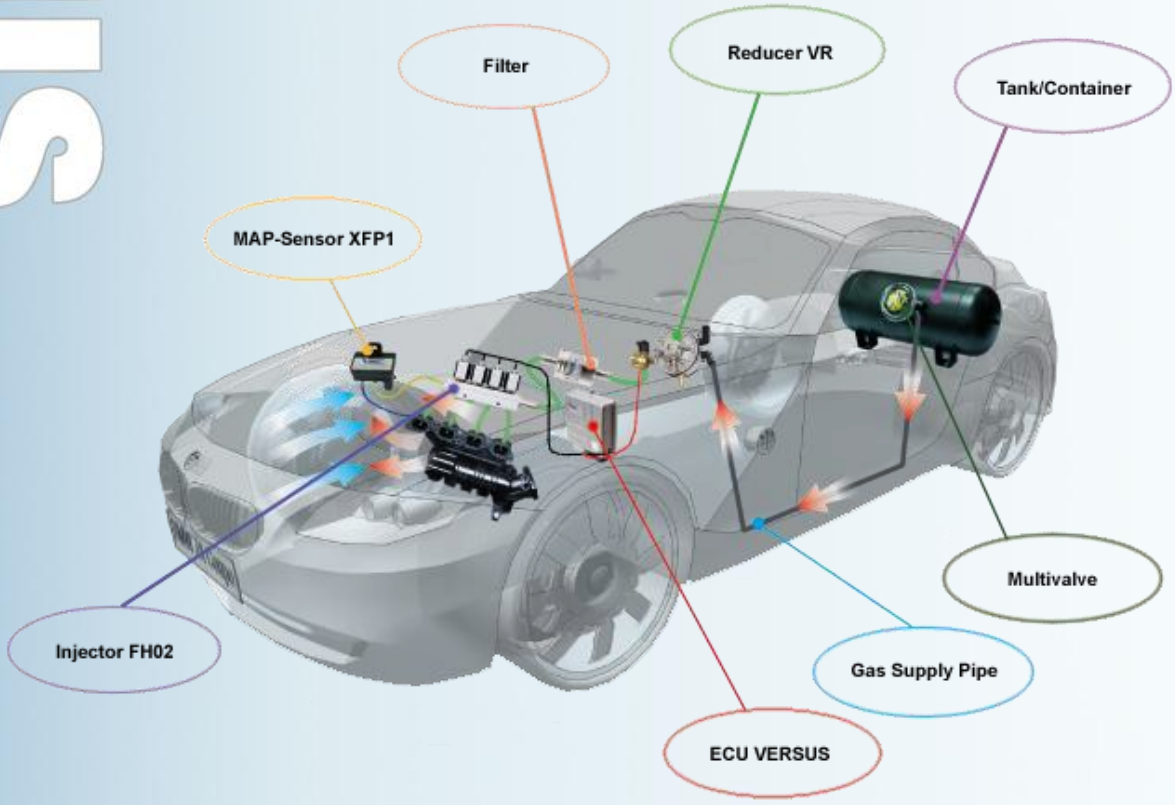
GENERAL INFORMATION

Versus Sequential gas system is a good solution for the latest generation of vehicles, it represents the most advanced level of development of the gas injection devices. System VERSUS is fully automatic and maintenance-free. It immediately switches to the gasoline mode when the gas tank is empty. After refueling at least a half tank, it automatically switches to the gas supply. In the event of failure of any component or leakage of the system it automatically disconnects all the valves and switches to gasoline. Practically the only required element of VERSUS operating system is its regular service at an authorized workshop. All key elements of the VERSUS meet the safety requirements of the regulations ECE110R00 and ECE67R01.

This manual almost entirely describes the possible states of a call by the user and VERSUS system safe operation. Before using the car fueled with gas, refer to its contents. If in doubt, ask the staff assembly workshop with detailed explanations of the operation of the system VERSUS.



See more information about SGI VERSUS system components in our website www.versusgas.com. Bookmark: USERS safe driving/SGI VERSUS SYSTEM BASIC DESCRIPTION.

Gasoline supply

Normally the vehicle engine is started with the basic fuel - gasoline. Switching to gas supply is carried out automatically after obtaining appropriate values such as the right temperature and engine RPM to ensure proper operation of the gas-powered engine. Always avoid low amount of Gasoline l in the tank. The small state of the fuel can damage the fuel pump. Driving on the so-called reserve is not recommended.

Filling the gas

CNG: In most countries, CNG refueling is done only with the help and participation of the station staff. When gas is compressed the temperature of the gas tank mounted in the vehicle may increase due to the physical properties of this process. It is a natural process and fully safe from the point of view of the vehicle operation.

LPG: Filling takes place through a gas valve, which limits the available capacity of the tank to 80%. Level indicators show the gas tank fill up to full at 80% actually used the tank volume. For example, a tank with a capacity of 50 liters can be filled up to 40 liters of LPG only.

Always observe safe refueling rules. Ask station staff for more details.

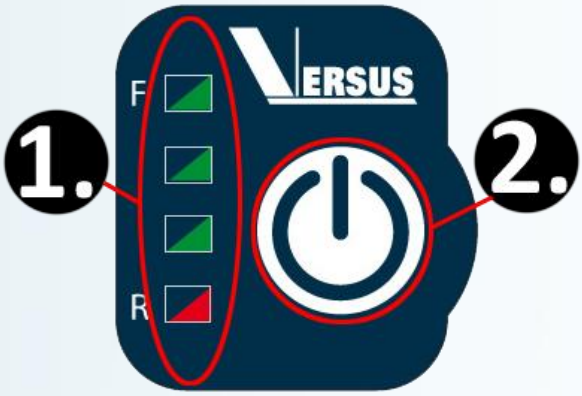
VERSUS SWITCH - its functions and service

This switch allows manual selection of the type of fuel: gasoline or gas. It is possible also to activate other states of VERSUS system, widely described in this chapter. VERSUS system in normal operation is 100% maintenance-free, which means that manual switching the fuel is not required from the user of the system.

VERSUS controller mode signaling

Picture 1a: VERSUS switch – general view

1. VERSUS Switch “MODE” and other states display
2. VERSUS change-over switch button



There are three basic modes of operation:

“AUTO” mode

Picture 1b: “AUTO” mode display

In the "AUTO" on the switch all the LEDs blink as shown in Picture 1b. Operating in this mode means that the gasoline is supplied, and engine is ready to switch to gas supply after meeting the switching parameters (gas temperature, engine RPM, programmed switching time). Readiness to switch to gas is indicated by flashing LEDs.

Automatic switching to gas supply

After turning the key to the ignition, system is activated – the fuel switch LEDs start blinking. In this case, the vehicle continues to be operated on gasoline. After fulfilling all the switching conditions, system changes the fuel to gas supply (LEDs stop blinking, light up). If extended features of VERSUS buzzer system are programmed, this process can be further indicated with beep signal. Ask the installer workshop staff for more details.

Manually switching to gas supply

In order to switch from gasoline (no LEDs are highlighted) to the gas engine supply, press the switch. LEDs will flash - the engine is still powered with gasoline. After fulfilling all the conditions required to switch mode, system is switched on gas supply (LEDs stop blinking – start light up).

“GASOLINE” mode

Picture 1c: “GASOLINE” mode display

When “GASOLINE” mode is operating, all LEDs on the switch are off, as shown in Picture 1c. This means that the engine is powered by gasoline, regardless of the switching parameters. The change of fuel type is possible only by pressing the switch. When pressed, the VERSUS system switches to "AUTO".

During the operating conditions, in order to switch the engine from gas (LED lit) to gasoline supply, press the switch. LEDs are off which means that the engine is gasoline powered.

“GAS” mode

Driving with the gas supply is indicated by highlighted one or more LEDs on the fuel switch. The current level of gas in the tank is displayed after switching the engine to gas supply. Indication of the level of the gas in the tank shall be treated as estimation of the amount of the gas in the tank, because of the high inertia of a gas in the tank and the technical capabilities of the measurement system.

The amount of gas in the tank

Tank full - light up all the LEDs (Picture 1d)

Picture 1d: Tank full

3/4 of the tank (Picture 1e)

Picture 1e: 75%

1/2 of the tank (Picture 1f)

Picture 1f: 50%

1/4 of the tank (Picture 1g)

Picture 1g: 25%

Reserve of gas in the tank (flashing red LED - Picture 1h)

Picture 1h: Reserve

Automatically switching to gasoline from gas supply

During operation of the system in gas mode (LEDs lit) it is possible to automatically switch to gasoline power. Automatically switches to gasoline power occurs in two cases:

Picture 1i: "EMPTY" Tank mode display

a) Lack of the gas. Automatic switching to gasoline due to the lack of gas is indicated by flashing LEDs one after the other (Picture 1i), and also by beep signal. In this mode, the engine is powered with gasoline.

b) Error or system failure. In case of failure to launch "AUTO" mode from the switch, contact the workshop fitting the VERSUS system. The system automatically closes the gas valves and return directly to gasoline supply (no LEDs highlighted). In addition, the process will be indicated with beep signal.

Other possible modes of the controller:

"AUTO-TUNING" mode

Picture 1j: "AUTO-TUNING" mode display

VERSUS latest control units are equipped with automatic tuning system to ensure that the driving parameters are determine to the optimal. Auto-tuning can be programmed by the installer and is indicated by the upper LED continuous flashing on the switch (Picture 1j). Illumination of the other LEDs is possible, in addition to flashing top LED in this mode.

NOTE: In auto-tuning mode, pressing the switch button to change fuel is undesirable. In this case, the automatic tuning may take longer than expected 30-40 minute drive.

Completing of auto tuning is indicated by four beep signals. Then the controller switches to "AUTO".

"GAS LEAK DETECTION" mode

Picture 1k: "GAS LEAK DETECTION" mode display

1. The engine should be started, working with gasoline ("AUTO" mode with the diodes blinking or "GASOLINE" mode with no diodes shining/blinking)
2. Press and hold the switch button for about 10sec.
3. After this time one beep signal can be heard and the switch starts to indicate the process of testing with two extreme diodes blinking (see Picture 1k).
4. Release the button and wait for test end.

Scenarios:

Picture no 1l: leakage test positive

a) <u>Test positive</u> – no leakage:
For the next 15 seconds measurement of pressure is made and if there is no drop of the pressure (there is no a leak), the controller completes the procedure that is confirmed with:
- Two top diodes shining for 3 seconds (Picture 1l) and
- One beep signal can be heard

After this time the controller switches the mode to "AUTO" mode.

Picture no 1m: leakage test negative

b) <u>Test negative</u> – leakage detected:
If within 15 seconds, the controller registers a pressure decrease of more than 15kPa the controller completes the procedure that is confirmed with:
- Two bottom diodes shining for 3 seconds (Picture 1m) and
- Triple beep signal can be heard

After this time the controller switches to "Gasoline" mode.

Notes:

- In case a tank is empty, the leakage test will never be performed correctly, the result will be negative. Please make sure that the tank is at least ¼ filled.
- Please note that this procedure can only check for leakage of the output section of the regulator, gas hose with filter, injection rail and Pressure sensor/Map-Sensor. Other leaks are not detected.
- The efficiency of the procedure also depends strongly on the type of regulator (solenoid valve must be attached close to the regulator). In case the solenoid valve is located far away from the reducer and there is a pipe full of gas between the devices, the potential pressure falls of the evaporated gas pressure will be compensated by GAS coming from this intermediate pipe. In such special cases (solenoid valve far away from the reducer), medium and small leaks are not being detected.
- It is unacceptable to check the leaks just by using the above procedure. Leak test always must include all pressure connections with the use of appropriate leak testers.

SAFE HANDLING OF CAR FUELED WITH GAS

Regular maintenance of the VERSUS system components and all other components of the vehicle is essential to ensure the safe and efficient operation of the GAS system. Conducting periodic reviews extend life and proper operation of components contributing to the reduction of operating costs.

Maintenance service

The reviews are provided for every 10,000 km and help ensure full efficiency of the system. VERSUS system enables signaling of the inspection - this function can be programmed by the installer. Ask the installer for details.

Maintenance inspections of the VERSUS system are not replace for the manufacturer's suggested maintenance of the vehicle, which should be carried out in accordance with the vehicle manufacturer's service card.

1. Condition for safe operation of the vehicle with gas installation is to control technical state and systematic reviews of the gas components in authorized workshops.
2. Vehicle with a gas installation fitted should be mandatory technically tested at least once a year. This also applies to new vehicles.
3. VERSUS control unit should be protected from direct exposure to water. It is unacceptable to wash (especially with high pressure) the engine compartment, as it can result in damage / flood to non-warranty repair.
4. In case of a suspected failure of any of VERSUS system components not working correctly, it is essential to go to an authorized service workshop. In this case, the controller must be switched to gasoline supply (gas solenoid valves closed).
5. Any service and repair work should only be carried by authorized specialist of gas installation.
6. Vehicle refueling with gas installation must be carried out only by a trained gas station attendant.

7. The gas tank should be properly secured and protected. Please note that a vehicle having a gas system has less load capacity of the weight of the tank with gas. It is prohibited to use gas tanks and pipes dedicated for use other than installation in vehicles.
8. LPG is heavier than air, which means that in case of leakage to the atmosphere builds up in the lower part of the room / surroundings. Therefore, garage for gas installation vehicle with the channel is prohibited. The garage must have an efficient ventilation.
9. The vehicle, which was involved in a collision should be subject to inspection by an authorized installer of gas before re-use.
10. It is forbidden to:
    a) unauthorized repairs or adjustment of the gas
    b) vehicle fueling with economic or industrial gas
    c) overfilling the tank above the legal limit. Depending on the country and type of gas they are:
        - LPG: 80% tank's water capacity
        - CNG: 200-250 bar max operating pressure in the tank (requirements vary depending on the country). Ask the installer for more details
    d) use the installation after finding leaks
    e) search for leaks with a flame
11. Due to the technical parameters of the individual components, use only original spare parts of VERSUS system. In particular, it refers to the operational components such as filters, reducer repair kits and injection rails, system sensors and other strategic items.

OTHERS

Gas consumption

Due to the technical properties of the gas, it is possible and permissible amount of gas combustion increases by 10-20% compared to the amount of gasoline burned. This process, with the participation of the VERSUS controller, is primarily controlled by the gasoline control unit and original gasoline vehicle sensors.

Emergency system start up with gas supply

In case the vehicle cannot run on gasoline (e.g. due to fuel pump failure), it is possible to emergency run the vehicle on gas. To do this:

a) Press and hold the switch
b) Turn on the ignition and start the engine while holding the switch button pressed.
c) Release the switch.

NOTE: Please note that this is an emergency operation. Multiple engine running in safe mode can cause damage to the catalytic converter and other engine components. Emergency start is only possible with positive air temperatures and proper installation of

VERSUS system. This mode should be considered as a necessity. When engine started with gas supply, it is necessary to warm up the engine before driving on idle.

In case there are any hesitations how to use the system – always ask the installation workshop staff for more de tails.