

**Manual of installation and calibration  
the Akme LPG/CNG Sequential Gas Injection System.  
Frequent mistakes and recommendations.**

## **1. Introductory remarks**

Installation of sequential gas injection system, must be done by skilled workers, with obey the rules of gas installation in cars.

Before installation it is necessary to read the manual carefully.

Before we start installation of gas system we have to disconnect the minus of battery. In case when the battery is connected it is very important that installation of harnesses must be done only when the gas control unit and fuses are disconnected.

The gas control unit must be located in place where it is protected from high temperatures, water, petrol, grease and other chemicals.

All points of connection must be soldered very carefully and isolated properly. Wires must be secured against rubbing.

The gas control unit has got factory settings (default configuration) so it must be calibrated in every single car.

The most recent PC software is available on the website [www.kme.eu](http://www.kme.eu).

Gas inlets for the intake manifold must be installed very carefully, while keeping the intake clean. During drilling it is extremely important NOT to allow any filings to get inside the intake. For most cars it is advised to remove intake manifold prior to drilling.

Wire "+12V key" (red - pin A1 black connector) must be disappear after turn off the ignition. This connection can not load any other system in vehicle.

Do not connect to the shielded wires (do not cut the shield).

After the installation we must check tightness of gas connections.

## **2. General information**

The Akme LPG/CNG Sequential Gas Injection System is designed for vehicles with advanced petrol supply diagnostics system (OBD II/EObD), with catalytic converter and Lambda sensors, and meets the EURO 4 fuel emission standards.

The Akme system can be adapted to fit all engines with multi-point fuel injection, as well as sequential, semi-sequential or fullgoup and engines with turbocompressors (superchargers).

The use of a very fast microcontroller, acting as a signal processor and a “smart” controller of the output unit of the gas injectors, enables precise and instantaneous control of the gas-air mixture at the same moment (time point) at which the petrol ECU would inject fuel for the current cylinder.

The very precise and time-synchronized gas injection means that no difference is felt between running on gas and petrol. There is no significant loss of power or difference in the vehicle’s dynamics, and the vehicle offers the same acceleration when running on gas as with petrol.

The vehicle with the Akme LPG/CNG Sequential Gas Injection System will continue to meet fuel emission standards and will meet OBD II/EODB requirements without additional emulators.

The vaporized gas is supplied immediately in front of the valves – as in petrol system – which eliminates the possibility of explosions (caused by accumulation of gas in the large volume of the intake manifold).

All engine management and diagnostic functions remain unchanged.

The Akme system has an innovative algorithm, introduced by KME, for calibration of the vehicle during a road test. In all range of loads, the gas control unit collects points reflecting the operation of the engine on petrol and gas, creating maps of the operations of the vehicle. Comparison of those maps makes possible a precise configuration of the vehicle on gas, by establishing a map for gas identical to that for petrol.

Previously this could only be done by means of time-consuming tests using vehicle test benches (chassis dynamometer).

The gas control unit has a built-in mechanism for self-diagnosis.

The Akme system is very simple for installers to calibrate, and is transparent to the user thanks to the automatic switching mode. If the gas tank is almost empty the system switches automatically to petrol supply, and this is indicated by a sound signal (buzzer).

Installation is easy due to the small size of the enclosure and the convenient position of the attachment grip.

The gas control unit contains an internal petrol injector emulator.

The gas control unit enables it to be used with a variety of gas injectors., such as Matrix, Taurus, Rail, Valtek, ect.

The Akme system is available in 4-, 6- and 8- channel version for 3, 4, 5, 6, 8 cylinder engines.

System Akme works correctly with standard turbocompressors. With cars after tuning or with high supercharging it is possible to have some problems with working on the gas. Please consult Akme technicians in such case.

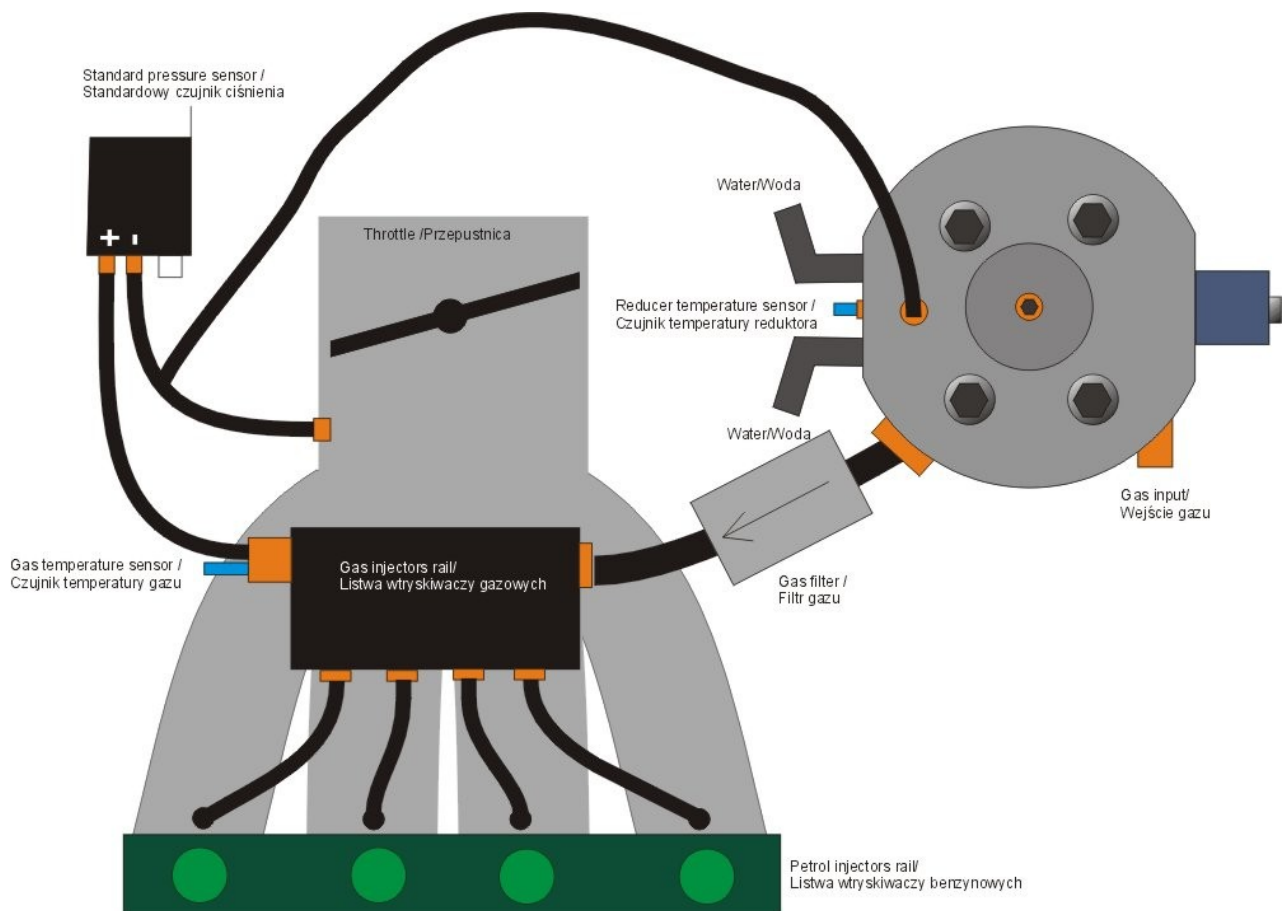
System Akme is ready for American and Japanese vehicles and for HEMI engines.

*For american cars like: DOOGE, CHRYSLER, for cars produced in Europe for American market (FORD, VOLVO) or for some others cars like: MITSUBISHI, it is required special version of gas control unit (with marking "USA").*

**System Akme does not work with engines, where injectors are controlled by duty-cycle (e.g. RENIX type) – where petrol injectors resistance is less than 3 ohms.**

### 3. Description and installation of elements.

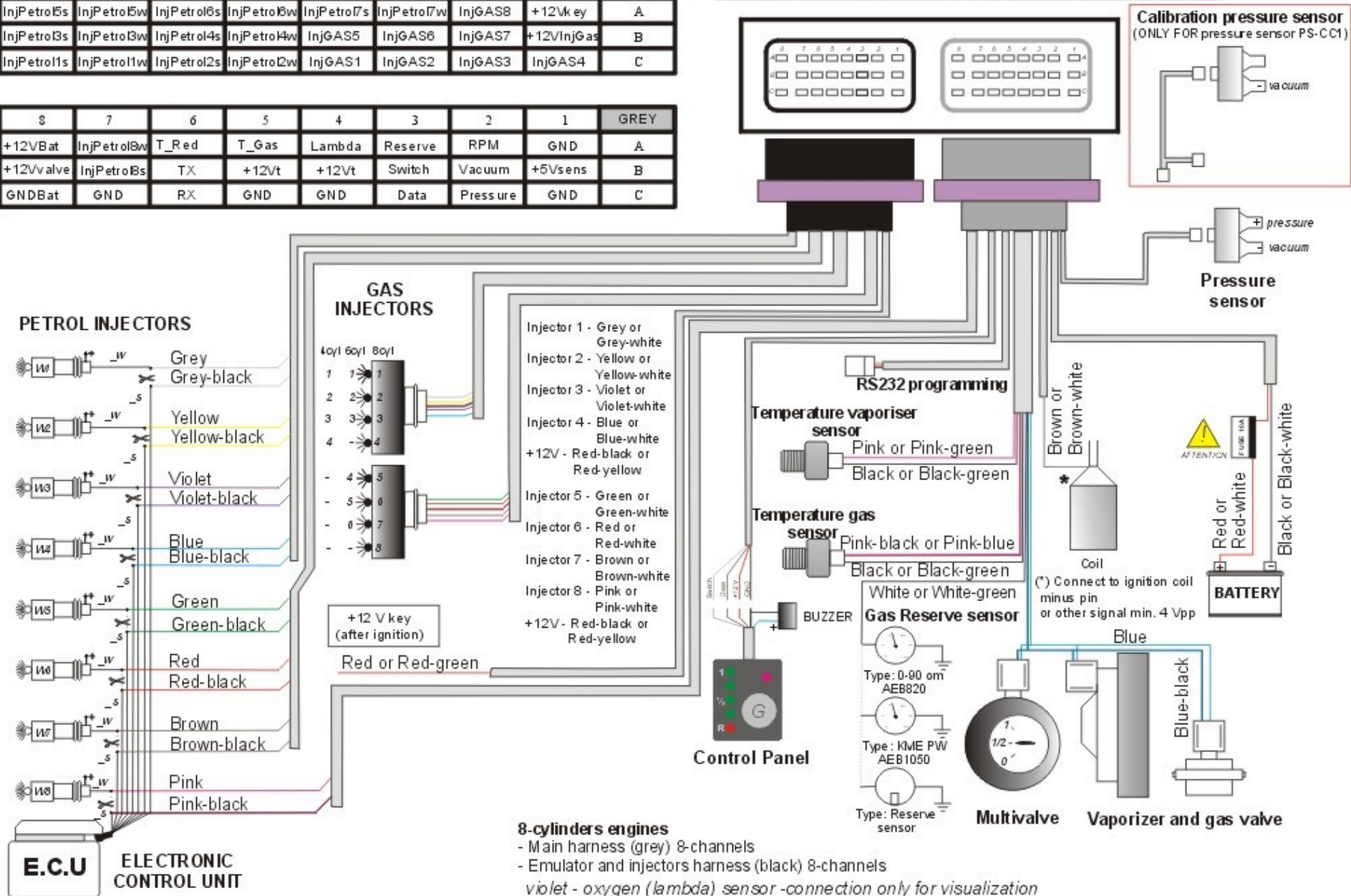
The diagram of mechanical and electrical connection.



8	7	6	5	4	3	2	1	BLACK
InjPetro15s	InjPetro15w	InjPetro16s	InjPetro16w	InjPetro17s	InjPetro17w	InjGAS8	+12Vkey	A
InjPetro13s	InjPetro13w	InjPetro14s	InjPetro14w	InjGAS5	InjGAS6	InjGAS7	+12VInjGas	B
InjPetro11s	InjPetro11w	InjPetro12s	InjPetro12w	InjGAS1	InjGAS2	InjGAS3	InjGAS4	C

8	7	6	5	4	3	2	1	GREY
+12Vbat	InjPetro18w	T_Red	T_Gas	Lambda	Reserve	RPM	GND	A
+12Vvalve	InjPetro18s	TX	+12Vt	+12Vt	Switch	Vacuum	+5Vsens	B
GNDbat	GND	RX	GND	GND	Data	Pressure	GND	C

### Connection guide for gas control unit



### 3.1 Gas control unit

The operation principle of the Akme system bases on the petrol injection system – separately and independently for each channel. At every moment while the engine is running, the petrol ECU's strategy of the fuel supply is used. The gas injectors are controlled by means of the signals which control the operation of the petrol injectors, which in turn come out of the current engine need (required for power and dynamics).

Aluminum enclosure and electronic elements which are working in wide range of temperatures are used to guarantee the correct operation of gas control unit and resistance to interference.

The special build of plugs guarantee correct connections.

The gas control unit is available in 4-, 6- and 8- channel version:

- 4 cylinders version, for engines with 3,4 cylinders
- 6 cylinders version, for engines with 3,4,5,6 cylinders
- 8 cylinders version, for engines with 3,4,5,6,8 cylinders

In engine compartment the gas control unit must be installed with connectors downwards.

The gas control unit must be located in place where it will be protected from high temperatures, water, petrol, grease and other chemicals.

The gas control unit designation is printed on the connectors.

#### 3.1.1 The gas control unit designations.

Each gas control unit is identified by printed series of description on the connectors.

E8 67R-013787	type-approval number for LPG
E8 110R-004297	type-approval number for CNG
KME-DIEGO	manufacturer and type
8	the maximum number of channels (injectors)
C0017	series and serial number
05/07	manufacturing date
1.5D	hardware and software version (1.2, 1.3a, 1.4D, 1.5D)
	- number informs about hardware version
	- letter informs about software version

Attention!!! The gas control unit with different hardware version need corresponding PC software (, 1.3.x.x, 1.4.x.x):

- 1.2x [Diego-1.2.6.9 v1.2](#)
- 1.3x [Akme+USB Driver-1.3.2.6-v1.3](#)
- 1.4x and 1.5x [Akme+USB Driver-1.45.2.x-v1.45](#)

The most recent PC software is available on the website [www.kme.eu](http://www.kme.eu).

### **3.2. Gas control panel and gas level sensor.**

Gas control panel allows changing supply system from petrol to gas. After pushing the button there is a sound from a buzzer. Diodes on a panel show the gas level in the tank (with the co-operation with gas level sensor on multivalve).



During the ride on petrol there is no light on control panel. Gas valves are closed and gas injectors do not work. In this case gas control unit is in stand-by and it does not affect original petrol supply system.

After the button is pushed on the control panel, the status diode is flashing (blinking). It informs that the system is ready to change to gas supply and is waiting for the switching parameters.

The switching parameters are configured by PC software.

When switching parameters are fulfilled, the gas control unit switches to gas. The status diode is lighting constantly and control panel starts to show gas level.

The readings of gas level are possible when gas level sensor is installed on multivalve.

The gas control unit is operating with the following type of sensors:

- 9-level (PW1-KME, PW2-KME, AEB1050, EMER1D, AEB806 (for CNG) or compatible)
- 0-90 ohm (AEB820, BRC or compatible)
- reserve sensor

4 lighting green diodes mean the tank is full.

2 lighting green diodes mean the tank is half full.

Red diode means the tank reserve.

Those indications are approximate.

Gas control panel must be installed inside the passenger compartment (in handy place, near driver). The hole for control panel enclosure should have 8mm diameter. Wires

from panel should be connected with adequate wires from harness by soldering in principle “color to color”.

Red wire “+” from buzzer must be connected with blue wire from control panel. Other buzzer wire “-” must be connected with black wire from harness.

### **3.3. Reducer**

The reducer guarantee gas evaporation from liquid phase to gaseous phase by using heat from cooling system. It measures pressure in intake manifold and it keeps constant gas pressure independently of engine load.

The output pressure value can be regulated in wide range (0.6...1.8bar). The recommended working pressure is 1 bar.

The reducer is available in the following versions:

SILVER (with integrated valve)	to 200kW (273HP)
SILVER FZ (without integrated valve)	to 200kW (273HP)
GOLD (with integrated valve)	to 260kW (355HP)

Gas control unit monitors the reducer temperature. If the temperature is below the switching threshold (set in the PC software), the engine is fuelled by petrol. When the threshold is reached, the gas control unit switches the system to gas supply. This procedure ensures that the gas flows through the reducer only when it can be vaporized completely.

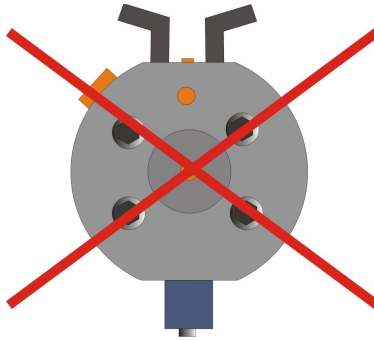
Reducer can be installed in parallel or perpendicular to vehicle axis.

Because of large weight reducer must be installed solidly to vehicle-car body.

It is not recommended to install reducer water inlets in serial to cooling system. This way of connection may reduce the flow of the engine coolant and may cause overheating of the engine.

The reducer cannot be installed with the coil of gas valve downwards. This may result in valve seizure (stop) due to dirty gas.

To adjust working pressure the 4 mm imbus hexagonal wrench is required.



The recommended hose diameters:

- cooling system – 17 mm
- gas inlet in liquid phase – the copper pipe 6 mm or 8 mm
- gas outlet in vaporize phase – 14 mm
- vacuum inlet from intake manifold – 5 mm

### 3.4. Gas injectors

The gas control unit Akme can operate with several kind of gas injectors, such as: Matrix, Taurus, Valtek, Rail etc.

For each type of gas injector it is necessary to choose correct gas injector type in PC software.

For each type of gas injector it is necessary to write default value of “MULT” and “Offset” parameter according to the following table:

Gas injector	MULT	Offset
MATRIX	0% (1,0)	1,0
REG	0% (1,0)	2,5
VALTEK (3ohm)	0% (1,0)	2,0
VALTEK (1ohm)	0% (1,0)	1,0
ZAVOLI (3ohm)	0% (1,0)	2,5
MAGIC JET	0% (1,0)	1,0
TAURUS	0% (1,0)	1,0
RAIL (3ohm)	0% (1,0)	2,0
RAIL (1ohm)	0% (1,0)	1,0

In case of the 6-cylinders engines and 4-sections gas injectors rail only the first 3 sections of each injectors rail are used.

### 3.4.1. Selection of nozzles.

The preliminary nozzles size is selected according to the following table:

<i>Range of engine power per cylinder [HP/cyl]</i>	12-17	18-24	25-32	33-40	>40
Nozzles size	1,8mm	2,1mm	2,4mm	2,7mm	3mm

*In case of engines without sequential injection system (semi-sequential, fullgroup), the nozzles must be one size smaller than sizes from table.*

New gas control unit diEGO has nozzles diameter suggestion mechanism (based on capacity, power, injection type, petrol time on idle).

### 3.5 Pressure sensor types

Connectors simplify installation and eliminate possibility of mistake.

#### **Pressure sensor PS-CC1 type**

Differential pressure sensor measure difference between pressures in injector rail and vacuum inside intake manifold.

For PS-CC1 pressure sensor type, indispensable for collecting the Map is to use additional calibration set with pressure sensor, which is linked to vacuum only.

#### **Pressure sensor PS-CC2 type**

Two pressure sensors into one enclosure. First measure pressure in injector rail, second measure vacuum inside intake manifold.

### **3.6 Temperature sensors**

It is necessary to install gas temperature sensor and reducer temperature sensor. Depending on the position where it is installed there are several types of temperature sensor.



### **3.7 Gas filters**

To ensure good performance of the gas system it is always necessary to use both liquid phase filter and vaporized phase filter.

Attention!!! Filters have gas flow direction strictly defined.

### **3.8 Gas inlets to the intake manifold.**

Gas inlets to the intake manifold must be installed very carefully, while keeping the intake clean. During drilling it is extremely important NOT to allow any filings to get inside the intake. For most cars it is advised to remove intake manifold prior to drilling.

The holes for gas inlets to the intake manifold should be drilled as close as it is possible to cylinder head. It is important to keep the same hoses length to each cylinder. The holes should cross axis of each intake pipe. Gas inlets should be directed to the cylinder.

Holes for gas inlets should be made by drill with diameter 5mm, after that holes should be tapped to M6. Gas inlets should be protected against accidental unscrewing.

## 4. Installation harnesses

The gas control unit can operate with engines which have max 8 cylinders/channels. In the kit there are 5 main types of connection wires.

Common color coding has been applied to certain function blocks in order to avoid the incorrect connections.

### 4.1. Harness description

#### **Type 1. Main harness (gray) 4,6 cylinders – the same for 4 and 6 cylinder version.**

Pair of wires – red or red-white [A8] and black or black-white [C8]

Connected to the battery: red or red-white to “+”, black or black-white to “-”. It is very important to install fuse 10A on the red or red-white wire.

Pair of wires – blue-black [C7] and blue [B8]

Supply for gas valves +12V: blue to +12V, blue-black to GND.

Pair of wires – black and black or 2xblack-green [A1]

The GND for temperature sensors.

Pink or pink-green wire [A6]

To reducer temperature sensor, other black wire from sensor to GND [A1].

Pink-black or pink-blue wire [A5]

To gas temperature sensor, other black wire from sensor to GND [A1].

Violet wire [A4]

To oxygen sensor (lambda sensor). Connection is not mandatory.

White or white-green wire [A3]

To gas level sensor. Corresponding type of sensor we can chose in PC software.

Depending on the sensor type we connect:

resistance sensor, reserve (double wires) between GND and input to gas control unit,  
9-level (triple wires) to +12V and GND and to input to gas control unit.

Brown or brown-white wire [A2]

RPM input signal from minus of coil or from Hall sensor with min voltage +4V.

#### ***The 4-wire harness.***

Harness (1,2m) with MOLEX 4 connector – to pressure sensor

Red [B1]    Black [C1]    Blue or White [C2]    Grey or Brown [B2]

Harness (0,3m) with MOLEX 8 connector – to PC computer

Red [B5]      Black [C5]      Yellow or White [C6]      Green or Brown [B6]

Harness (1,8m) – to gas control panel

Red [B4]      Black [C4]      White [B3]      Brown [C3]

## **Type 2. Main harness (gray) 8 cylinders**

Pair of wires – pink-black [B7], pink [A7]

Petrol injector emulator for 8th cylinder. Pink-black wire on the petrol ECU side, pink wire on the petrol injector side.

**Remaining wires the same as in Type 1.**

## **Type 3. Injectors harness (black) 4 cylinders**

Pair of wires – gray-black [C8], gray [C7]

Petrol injector emulator for 1-st cylinder. Gray-black wire on the petrol ECU side, Gray wire on the petrol injector side.

Pair of wires – yellow-black [C6], yellow [C5]

Petrol injector emulator for 2-nd cylinder. Yellow-black wire on the petrol ECU side, yellow wire on the petrol injector side.

Pair of wires – violet-black [B8], violet [B7]

Petrol injector emulator for 3-th cylinder. Violet-black wire on the petrol ECU side, violet wire on the petrol injector side.

Pair of wires – blue-black [B6], blue [B5]

Petrol injector emulator for 4th cylinder. Blue-black wire on the petrol ECU side, blue wire on the petrol injector side.

Grey-white or grey wire [C4]

The 1-st gas injector.

Yellow-white or yellow wire [C3]

The 2-nd gas injector

Violet-white or violet wire [C2]

The 3-th gas injector

Blue-white or blue wire [C1]

The 4-th gas injector

Pair of wires – red-black and red-black or 2xred-yellow [B1]

Two wires (+12V) to gas injectors

Red or red-green wire [A1]

“+12V key” - from petrol injectors (check if the voltage disappear after turn off the ignition). If the voltage will not disappear connect this wire do +12V after ignition “key”.

#### **Type 4. Injectors harness (black) 6 cylinders**

Pair of wires – green-black [A8], green [A7]

Petrol injector emulator for 5-th cylinder. Green-black wire on on the petrol ECU side, green wire on the petrol injector side.

Pair of wires – red-black [A6], red [A5]

Petrol injector emulator for 6-th cylinder. Red-black wire on the petrol ECU side, red wire on the petrol injector side.

Green-white or green wire [B4]

The 5-th gas injector.

Red-white or red wire [B3]

The 6-th gas injector.

**Remaining wires the same as in Type 3.**

#### **Type 5. Injectors harness (black) 8 cylinders**

Pair of wires – brown-black [A4], brown [A3]

Petrol injector emulator for 7-th cylinder. Brown-black wire on the petrol ECU side, brown wire on the petrol injector side.

Brown-white or brown wire [B2]

The 7-th gas injector.

Pink-white or pink wire [A2]

The 8-th gas injector.

**Remaining wires the same as in Type 4.**

### ***4.2. Verification of connecting the sequence of cylinders.***

After installation of the gas system it is necessary to check the order of injectors connection.

For each cylinder the circuit must be closed.

For each channel of gas control unit signal from each petrol injector (corresponding cylinder) must be linked to corresponding channel of gas control unit which control gas injector.

*If the injectors are connected incorrectly, system Akme can not work properly or problems may occur with the calibration of Akme system.*

Version: 4 cylinders

<b>Cyl.</b>	<b>Emulator wire (petrol ECU side)</b>	<b>Emulator wire (petrol injector side)</b>	<b>Gas injector wire</b>
1	Gray-black	gray	gray-white or gray
2	Yellow-black	yellow	yellow-white or yellow
3	Violet-black	violet	violet-white or violet
4	Blue-black	blue	blue-white or blue

Version: 6 cylinders

<b>Cyl.</b>	<b>Emulator wire (petrol ECU side)</b>	<b>Emulator wire (petrol injector side)</b>	<b>Gas injector wire</b>
1	Gray-black	gray	gray-white or gray
2	Yellow-black	yellow	yellow-white or yellow
3	Violet-black	violet	violet-white or violet
4	Blue-black	blue	blue-white or blue
5	Green-black	green	green-white or green
6	Red-black	red	red-white or red

Version: 8 cylinders

<b>Cyl.</b>	<b>Emulator wire (petrol ECU side)</b>	<b>Emulator wire (petrol injector side)</b>	<b>Gas injector wire</b>
1	Gray-black	gray	gray-white or gray
2	Yellow-black	yellow	yellow-white or yellow
3	Violet-black	violet	violet-white or violet
4	Blue-black	blue	blue-white or blue
5	Green-black	green	green-white or green
6	Red-black	red	red-white or red
7	Brown-black	brown	brown-white or brown
8	Pink-black	pink	pink-white or pink

In KME offer there is the device – TESTER OF CHANNELS/CYLINDERS - for testing wrong connections, malfunction of injectors etc. Please ask your distributor for details.

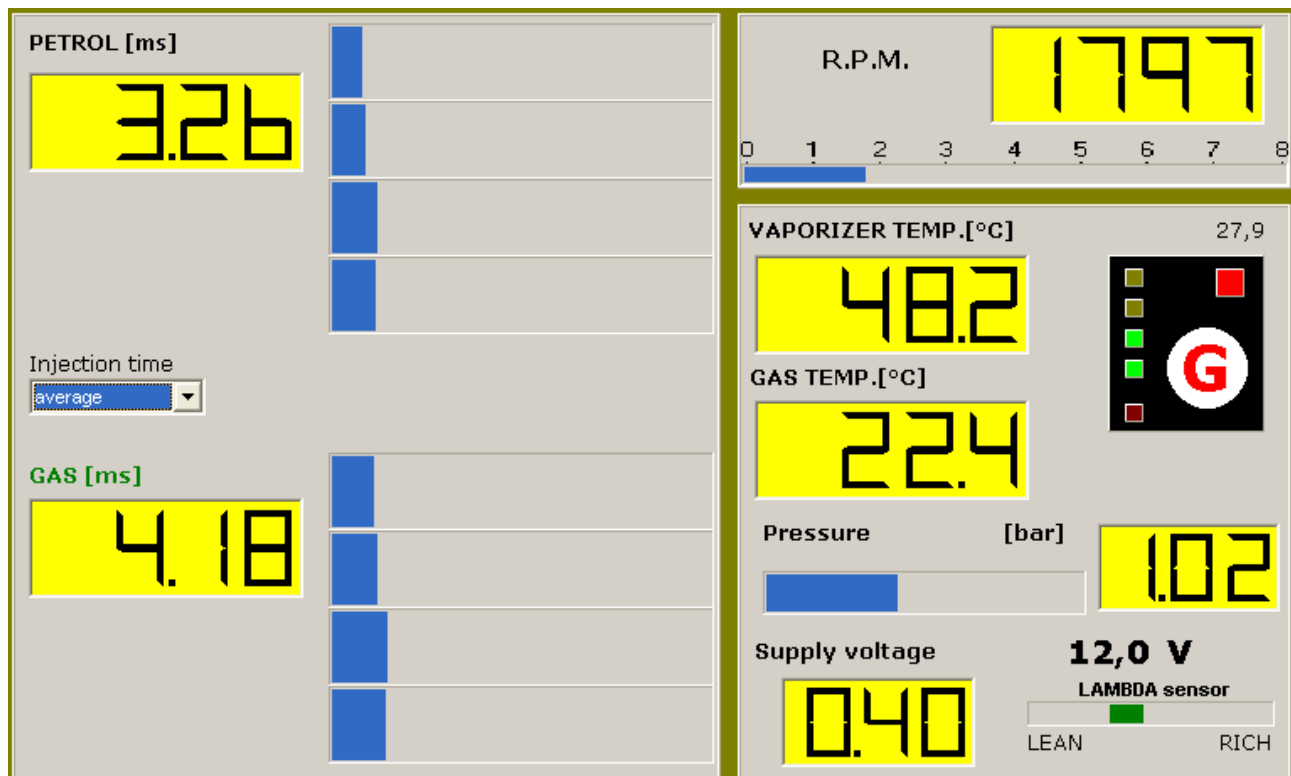
## 5. System configuration and calibration

Attention!!! The gas control unit with different hardware version (1.2, 1.3, 1.4, 1.5) need corresponding PC software (1.2.x.x, 1.3.x.x, 1.45.x.x).

The most recent PC software is available on the website [www.kme.eu](http://www.kme.eu).

### 5.1 The PC software description

After PC software installation and running it is necessary to choose a correct COM port. If the PC software is connected to gas control unit it is possible to check elementary parameters for gas control unit. The main tab of PC software is “Reading F2” tab. On this tab there are shown values from all sensors (gas and reducer temperature, supply voltage, pressure, Lambda, injection times). If all values are correct we can check Trouble codes (Diagnostic/Trouble codes tab).



If everything is correct and system does not display any trouble code we can go to Configuration tab.

The gas control unit has got factory settings (default configuration) so it must be calibrated in every single car.

EVERY CHANGE IN CONFIGURATION MUST BE CONFIRMED BY PRESSING  
“WRITE CONFIGURATION” BUTTON.

## 5.2. Calibration

Before Akme system calibration it is necessary to set default value for model parameters (Segments, Enrichments and “MULT” and “Offset” parameters) - for each type of gas injector - according to the following table:

Gas injector	MULT	Offset
MATRIX	0% (1,0)	1,0
REG	0% (1,0)	2,5
VALTEK (3ohm)	0% (1,0)	2,0
VALTEK (1ohm)	0% (1,0)	1,0
ZAVOLI (3ohm)	0% (1,0)	2,5
MAGIC JET	0% (1,0)	1,0
TAURUS	0% (1,0)	1,0
RAIL (3ohm)	0% (1,0)	2,0
RAIL (1ohm)	0% (1,0)	1,0

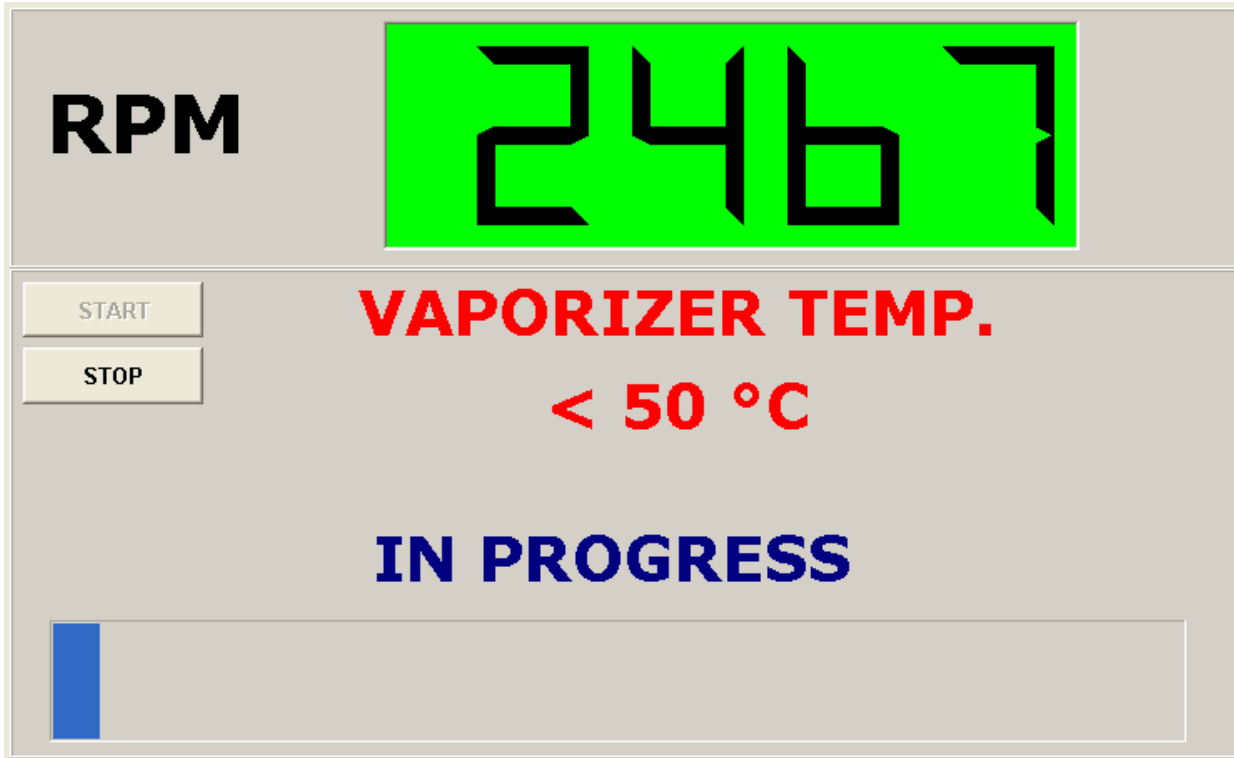
The tab Calibration/Modeling allows to manually set optimal parameters for each car.

## 5.3. Autocalibration

Autocalibration allows to adjust the Akme system on gas but **ONLY IN ONE WORKING POINT (ON IDLING)**.

**THE AUTOCALIBRATION DOES NOT GUARANTEE THE CORRECT WORK OF THE SYTEM ON GAS IN WHOLE RANGE OF LOAD.**

After starting of the engine we keep the constant R.P.M. (2500 +-300 r.p.m – green color of the display) and start Autocalibration.



Autocalibration changes the MULT parameter. The value of MULT parameter determines if nozzles size is correctly chosen.

Correctness of nozzles size is showed in the table:

Value of MULT parameter	Nozzles size
>+25% (>1,25)	too small - change diameter
+15% - +25% (1,15 - 1,25)	in range
-15% - +15% (0,85 – 1,15)	optimal
-25% - -15% (0,75 – 0,85)	in range
<-25% (<0,75)	too big - change diameter

**For engines without sequential injection system it is necessary to select precisely the nozzles size in order to keep MULT parameter in range -15% - +15% (0,85-1,15).**

**Imprecise selecting of nozzles results in instable r.p.m on idle.**

It's very helpful to have drill set from 1,8 mm to 3,0 mm (step by 0,1mm) to change the diameter of nozzles.

For small engines (below 1.2 l) it is possible to use smaller nozzles than 1.8 mm. In such case is necessary to solder the nozzles and next drill smaller diameter (1,5mm).

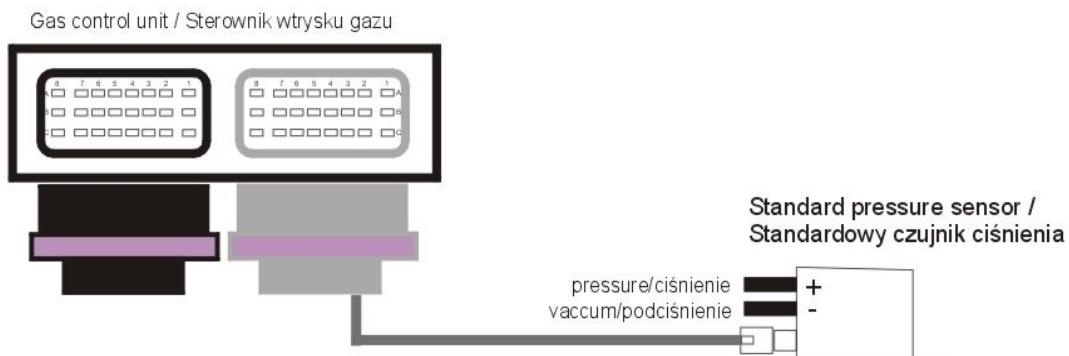
*When Map procedure is well made for all range of load system Akme works correctly in every car.*

## 5.4. Collecting the Map (the Map procedure)

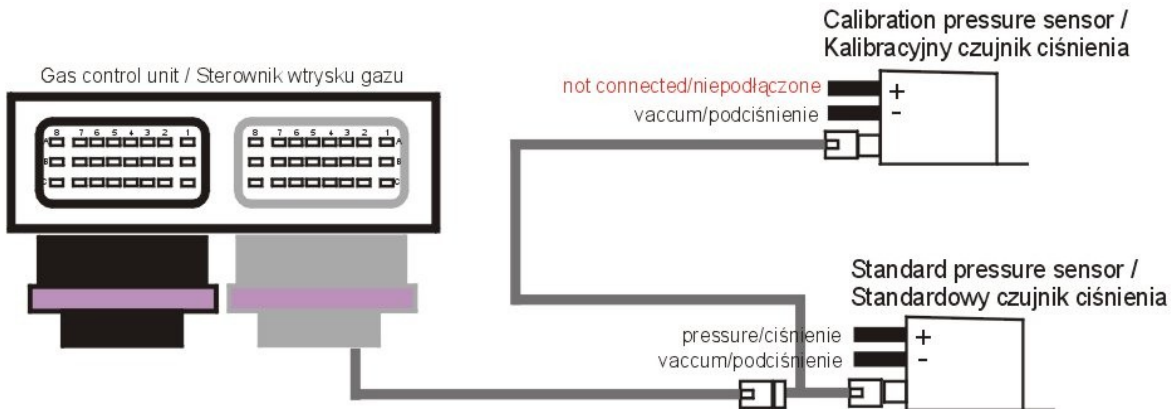
### 5.4.1. Connecting the calibration sensor for pressure sensor type PS-CC1

For PS-CC1 pressure sensor type, indispensable for collecting the Map is to use calibration set with pressure sensor, which is linked to vacuum only. Calibration set includes pressure sensor and calibration wire adapter.

Connecting the calibration sensor:  
Before



After



The shorter wire of adapter must be connected to the standard sensor and longer wire to calibration sensor.

The calibration sensor must be linked only to vacuum. The second nozzle (pressure) must be left without connection.

When the calibration set is correctly connected readouts of vacuum are shown in the software (on the Calibration/Map tab).

### 5.4.2. Road test

#### a) Parameters of road test

The road test should be done in the following way:

We ride with rotational engine speed which is chosen into PC software Map (F10) tab – for example 2500 (2250-2750 r.p.m).

**AT FIRST WE RIDE ON PETROL AFTER THAT ON GAS.**

	Parameters	Duration
PETROL	2nd gear 2250-2750 rpm	about 1 minute
	3th gear 2250-2750 rpm	about 1 minute
	4th or 5th gear 2250-2750 rpm	about 1 minute
GAS	2nd gear 2250-2750 rpm	about 1 minute
	3th gear 2250-2750 rpm	about 1 minute
	4th or 5th gear 2250-2750 rpm	about 1 minute

On each gear at least few points must be collected. The Map procedure can be finished when for each range of load (Low, Medium, High) are collect few points

Before starting the new Map procedure Petrol and Gas map must be cleared and all model parameters should be set as default value.

Red points create the petrol map while green points create the gas map.

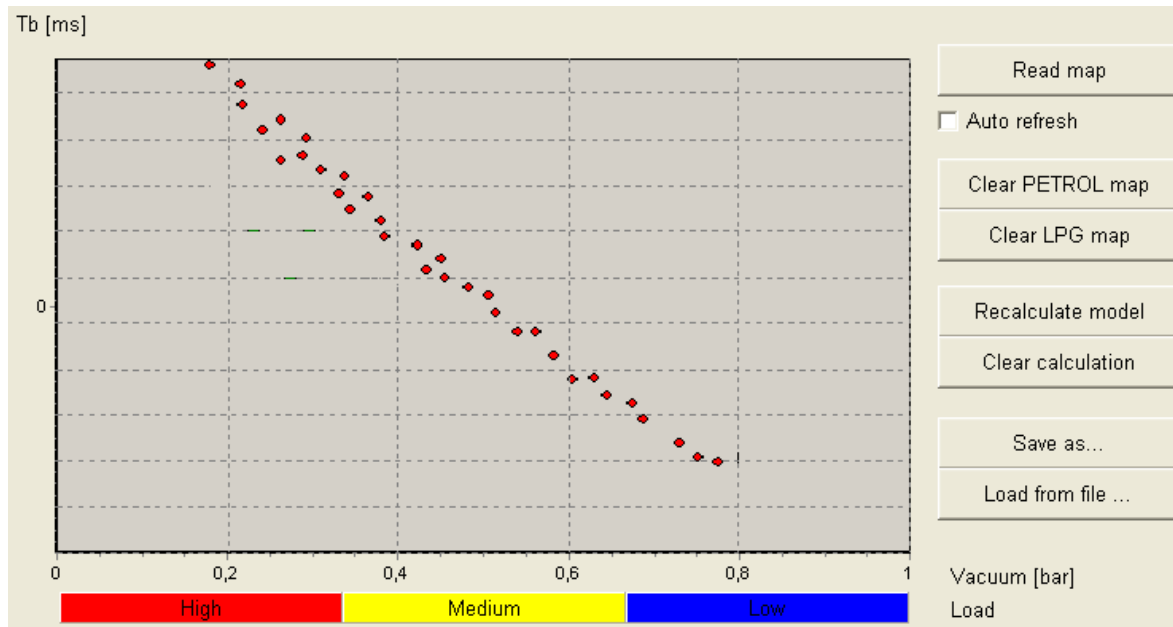
#### b) Drive on petrol.

AT FIRST WE RIDE ON PETROL.

Collecting points of the map we start on the ride on petrol.

The Map is correct when for each range of load are few points which create the petrol characteristic line. We need about 15-20 points on petrol. Sequential gas injection system Akme is calibrated according to that petrol map.

*Important, in every each range of load (Low, Medium, High) there must be several points.*



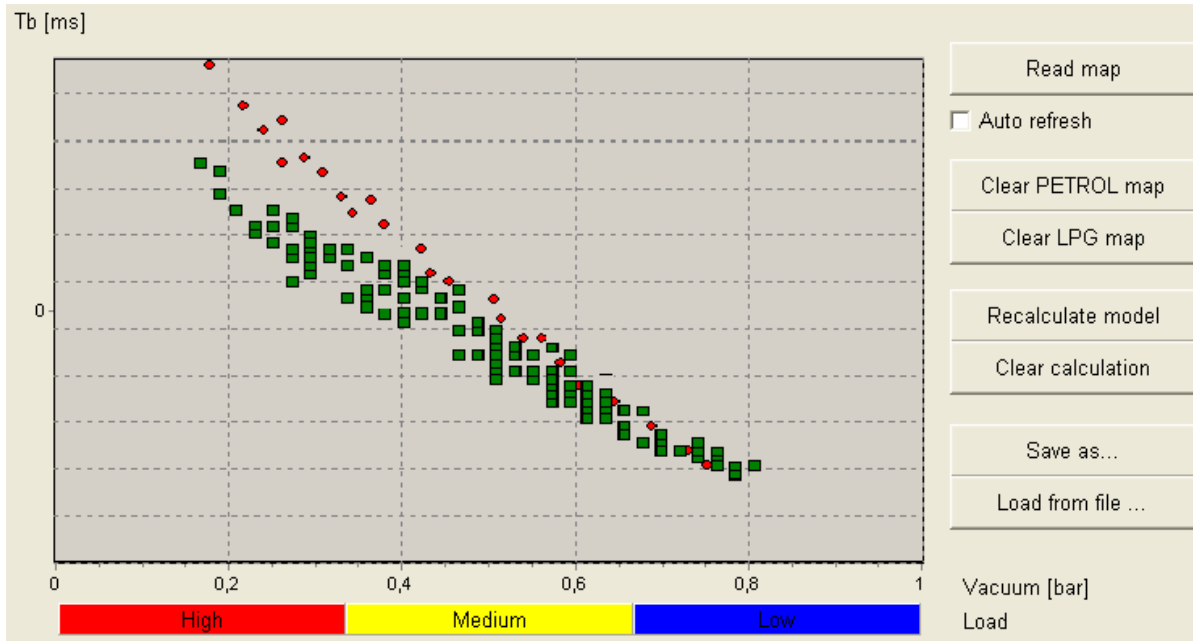
### c) Drive on gas and system calibration.

After collecting the point on petrol (petrol map) and switching to gas, we drive on gas collecting gas points.

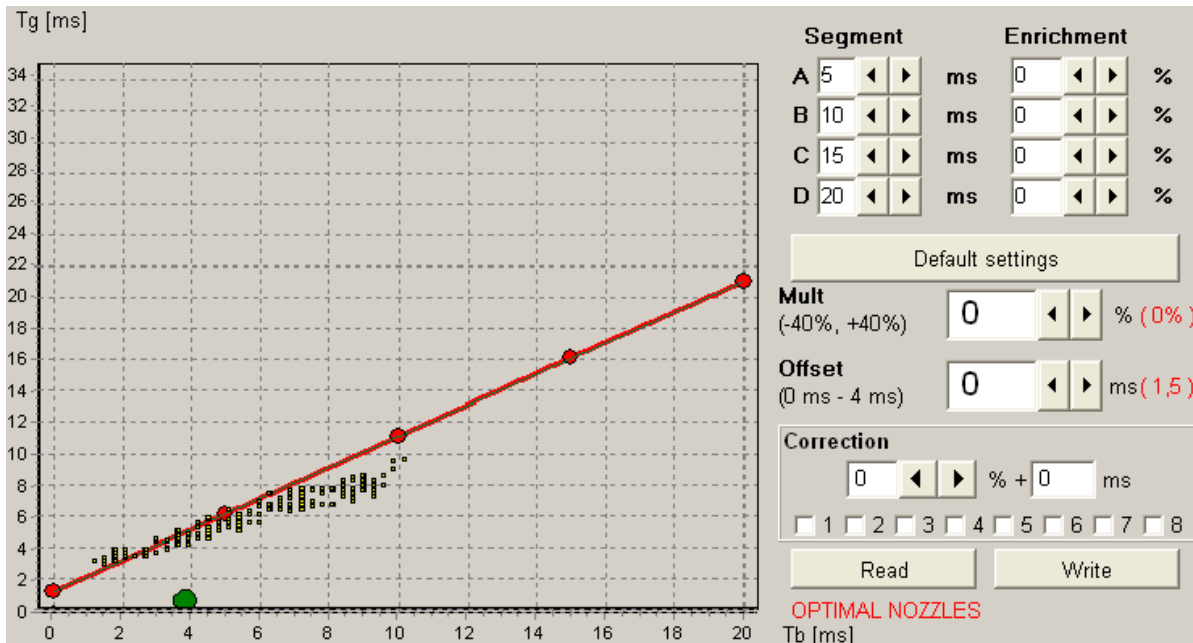
After collecting several points on gas, we click button "recalculate model" on Calibration/Map tab. Then all points will be automatically recalculated on a model (Calibration/Modeling tab).

We must change some model parameters manually, so that the red line should cover all points.

At the beginning all corrects should be changing by MULT parameter, and next we use segments and enrichments.



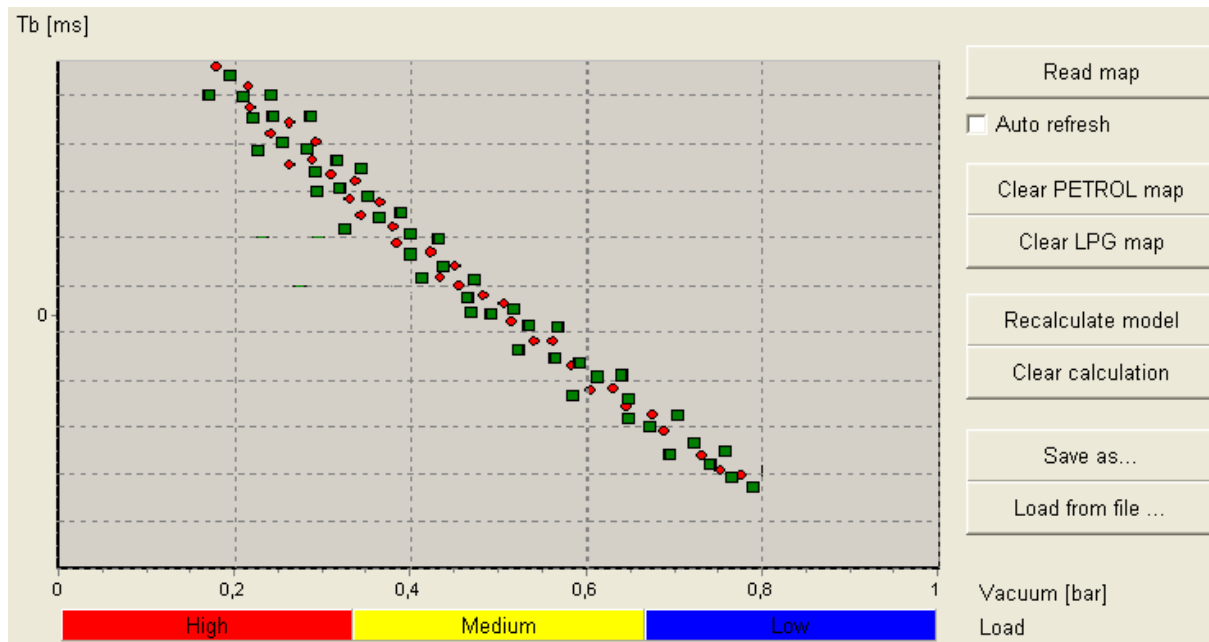
Above we can see that the petrol and gas points are covered for low and medium load. For high loads (value of vacuum < 0.5) the gas mixture is wrong. Button "recalculate model" switches us to Calibration/Modeling tab.



In this case it is needed the MULT parameter to be changed (MULT = +5%).

It is possible, in this case it is needed the segments to be changed (A-6, B-10, C-15, D-20) and enrichments to be corrected (A 0%, B-20%, C-20%, D-20%).

After changing the parameters it is necessary to clear ONLY gas map. After next drive on gas we should receive the following map.



If newly collected points still do not cover basic petrol map, it is necessary to go back to point d).

## 6. Frequent mistakes and recommendations.

### 6.1. Installation

- Very often in cars like FORD, we can encounter electromagnetic interferences which are caused by damaged elements of ignition system. In this case the connection of the enclosure of gas control unit to the minus of battery may be helpfully. This connection must be made by separate wire.
- When we use control unit with additional electromagnetic protection (FORD type) we remove effects but not reasons. Exchange of elements of ignition system (spark plugs etc.) remove those problems in 98 % of cases.

- When after switching to gas the engine stops it is necessary to check connection of emulator wires for each channel. It is possible that there is the wrong connection in place where petrol injectors are cut. Maybe the wires from petrol ECU and petrol injectors are exchanged (e.g. for first channel there are gray and gray-black wires).

- Do not place wires close to ignition system, coils etc.
- All signals (from petrol injectors, rpm, etc) should be taken from petrol ECU whenever possible.
- If the hoses from gas injectors to intake manifold are bent it can be possible that engine will not have full power.

**It is absolutely necessary to check elements of ignition system (spark plugs, high voltage wires and coils). Their bad condition can lead to work disturbance of the gas control unit.**

**If that problems appear in few months after installation it means that elements of ignition system become damaged.**

## ***6.2. Autocalibration***

If Autocalibration process is failed it is necessary to manually calibrate the gas system.

In this case it is necessary to adjust petrol injection times on gas. (petrol injection times should be the same on petrol and on gas). We adjust that injection times using "MULT" and "OFFSET" parameter. Wrong adjustment causes incorrect work system on the gas.

## ***6.3. The Map procedure***

Sequential gas injection system works correctly only if we execute the Map procedure.

If the gas control unit has not collected any points, check connection of pressure sensor and/or calibration.

If gas control unit is not calibrated by using Map procedure it can cause:

- "Check engine" (MIL) lighting
- high consumption of gas (more than 20% in comparison to petrol)
- vibrations during the changes gas-petrol-gas
- cylinders misfire detected
- engine not having full power
- engine shaking and not working on high r.p.m.

Change of any gas equipment (reducer, nozzles, filters, injectors ) or parameters (gas pressure) requires execution of the Map procedure on gas again.

#### 6.4. Engine shaking – injectors times disappear.

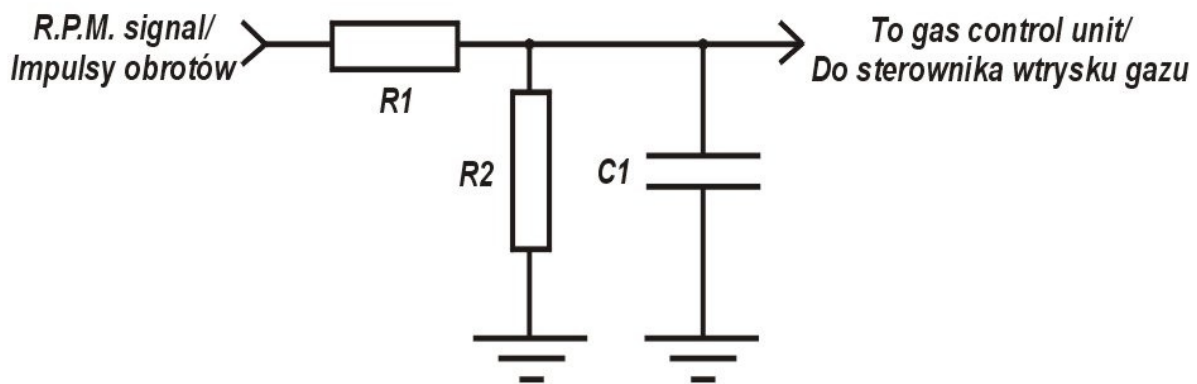
In cars where petrol injection times are very high (more than 20ms for high r.p.m.) the petrol injection times in the software may disappear.

Time of petrol injection disappear when:

- impulses of petrol injection merge (the petrol injectors are always open)
  - Reasons:
    - the gas mixture too lean
- impulses of gas injection merge (the gas injectors are always open – trouble code appears: Gas mixture too lean)
  - Reasons:
    - nozzles too small
    - pressure too small
    - wrong model parameters

#### 6.5. The modification of input signals

Because of the new strict norms which refer to exhaust gas emission in new cars, there may appear a problem with r.p.m signal reading (on idling appears value of 20000-25000 r.p.m). It is necessary to install another filter on r.p.m. signal.



For FORD Windstar 2003, FORD Focus 2003 (american version)  
 $R1=R2=100\text{k ohm}/0,5\text{W}$ ;  $C1=33\text{nF}/250\text{V}$

For FORD Expedition 2002 5,4l V8  
 $R1=15\text{k ohm}/0,5\text{W}$ ;  $R2=100\text{k ohm}/0,5\text{W}$ ;  $C1=33\text{nF}/250\text{V}$

## **7. Modification into new gas control unit „diEGO 1.4”**

- No major changes in hardware. No changes in connection diagram. The same harnesses / pins.
- New PC software 1.4.x.x - NOT compatible to older ECUs (will display appropriate message).
- Automatic serial/USB port detection and automatic re-connection.
- Password protection for ECUs. Installer may choose to lock the ECU with a password in order to avoid user manipulation. The lock may be released by resetting ECU to the factory settings.
- RPM reading modification. RPM measurement may be optionally taken from RPM sensor or petrol injection times.  
In the second case the RPM wire still MUST be connected to any sensor, which provides information that the engine is running. This may be for example camshaft sensor, inductive crankshaft sensor, Hall sensor, ignition coil, rev-counter.
- Automatic switching to gas only based on the temperature of the reducer (default when rpm for switching is set to 400rpm).
- Sequential emulator switching.
- Min. temperature for switching 20 degrees centigrade.
- Waiting 5 seconds after cranking before switching to gas (previously 10 seconds).
- Removed preinjection option/mechanism (was previously used for very low ambient temperature).
- More vehicle data saved into the ECU (injectors count, capacity, power, injection time on idle, injection system type, injectors type, reducer type, mounted nozzles diameter).
- Nozzles diameter suggestion mechanism (based on capacity, power, injection type, petrol time on idle).
- Fuel type setting - LPG or CNG.
- Semi-sequential gas injector control. Useful for full-group vehicles. In every petrol injection cycle only the half of gas injectors are opened (first odd, then even).
- Microinjections type engine (some EURO4 cars, many models of Mazda, Opel, Chrysler). Microinjections are ignored or added to the main injection.
- HEMI-type engine. Option to choose in the software (no need to have a different ECU).
- Petrol injector plus control. Option to use in vehicles, which petrol injectors have common ground and are driven by positive impulse.
- High power engines. Option to switch to petrol automatically when petrol injection times are fully open.
- External emulator. Option to switch valve and emulator in the same moment. Useful for situation when external emulator must be used (when petrol ECU needs inductive emulator load).
- Setting of earlier valve opening time.
- Model correction for chosen injectors. May be useful in case of V-type engine, when two banks do not have the same compression or lambda is poor.
- Verification of nozzles diameter on modeling tab. The system informs user if the

- nozzles are correctly chosen (too small, too big, in range, optimal).
- Standard values for MULT and OFFSET displayed on the modeling tab (according to chosen gas injectors).
- Option to choose one out of five RPM ranges for collecting map points.
- Trouble codes contains error level (INFO, ERROR).
- Frozen parameter frame. System records current parameters when the most recent error occurred.
- Injection time duty-cycle. It is clearly visible what is the ratio of time the injector is open and closed. Both for petrol and gas.
- When injectors are fully open the system indicates MAX on display.
- Automatic raise of the switching temperature when rail/gas temperature less than 10 centigrade.

## 8. Type-approval numbers

DIEGO gas control unit	E8 67R-013787
	E8 110R-004297
Reducers SILVER, GOLD	E8 67R-013949
Pressure sensor CC	E8 67R-013971
	E8 110R-004298
TAURUS injector rail	E8 67R-014220
MATRIX injector rail	E13 67R-010167
	E13 110R-000020
RAIL injector rail	E8 67R-014303
	E8 110R-004304
VALTEK injector rail	E8 67R-010104
	E8 110R-000040
MAGIC JET injector	E20 67R-010738
Gaseous phase filter MATRIX	E13 67R-010181
Gaseous phase filter VALTEK	E4 67R-010105
Gaseous phase filter CERTOOLS	E20 67R-010526
Liquid phase filter CERTOOLS	E20 67R-010531

## 9. HARNESSSES DESCRIPTION VERSION 2, 3, 4 & 5

All changes are specified on red color.

Description: SZ-GREY; CZ-BLACK;

## MAIN HARNESS GRAY VERSION 2 (SLEEVED)

Description on connector:

SZ2K 4/6 NRSER MM/YY
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SZ2K 8 NRSER MM/YY
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H O L E	Type 4/6	Type 8	FUNCTION	DESCRIPTION ON WIRE	WIRE COLOR	END CONNECTOR
A1			GND FOR TEMPERATURE SENSORS	-	2xBLACK	NON
A2			RPM	OBROTY	BROWN	NON
A3			LEVEL SENSOR SIGNAL	WSKAŹNIK	WHITE	NON
A4			LAMBDA	LAMBDA	VIOLET	NON
A5			GAS TEMPERATURE	TEMP. GAZU	PINK-BLACK	NON
A6			REDUCER TEMPERATURE	TEMP. REDUKTORA	PINK	NON
A7	NON		PETROL INJ. 8 (PETROL INJ. SIDE)	WTR. BENZ 8 WT	PINK	NON
A8			AKUMULATOR +12 V	+12V AKUM.	RED	NON
B1			+5V FOR PRESSURE SENSOR	-	RED	CONN1: MOLEX 2x2 [1]
B2			VACCUM	-	GRAY	CONN1: MOLEX 2x2 [2]
B3			PANEL SWITCH	-	WHITE	NON
B4			PANEL +12V	-	RED	NON
B5			INTERFACE +12V	-	RED	CONN2: MOLEX 4x2 [7]
B6			INTERFACE TX	-	GREEN	CONN2: MOLEX 4x2 [8]]
B7	NON		PETROL INJ. 8 (PETROL ECU SIDE)	-	PINK-BLACK	NON
B8			+12V GAS VALVES	+ GAZ	BLUE	NON
C1			GND FOR PRESSURE SENSOR	-	BLACK	CONN1: MOLEX 2x2 [4]
C2			PRESSURE	-	BLUE	CONN1: MOLEX 2x2 [3]
C3			PANEL DATA	-	BROWN	NON
C4			PANEL GND	-	BLACK	NON
C5			INTERFACE GND	-	BLACK	CONN2: MOLEX 4x2 [6]
C6			INTERFACE RX	-	YELLOW	CONN2: MOLEX 4x2 [5]
C7			GND GAS VALVES	-	BLUE-BLACK	NON
C8			GND AKUMULATOR	-	BLACK	NON

# INJECTORS HARNESS BLACK VERSION 2 (SLEEVED)

Description on connector:

XX=MX-MATRIX

XX=VT-VALTEK

XX=TR-TAURUS

CZ2K	4	XX
NRSER	MM	RR

CZ2K	6	XX
NRSER	MM	RR

CZ2K	8	XX
NRSER	MM	RR

HOLE	Type 4	Type 6	Type 8	FUNCTION	DESCRIPTION ON WIRE	WIRE COLOR	END CONNECTOR
A1				+12V AFTER IGNITION	+ WTRYSKIWACZ BENZ	RED	NON
A2	NON	NON		GAS INJECTOR 8	WTR. GAZ 8	PINK	CONN8[VT: 2x1] CONN 2[MX/TR: 6x1]
A3	NON	NON		PETROL INJ. 7 (PETROL INJ. SIDE)	WTR. BENZ 7 WT	BROWN	NON
A4	NON	NON		PETROL INJ. 7 (PETROL ECU SIDE)	-	BROWN-BLACK	NON
A5	NON			PETROL INJ. 6 (PETROL INJ. SIDE)	WTR. BENZ 6 WT	RED	NON
A6	NON			PETROL INJ. 6 (PETROL ECU SIDE)	-	RED-BLACK	NON
A7	NON			PETROL INJ. 5 (PETROL INJ. SIDE)	WTR. BENZ 5 WT	GREEN	NON
A8	NON			PETROL INJ. 5 (PETROL ECU SIDE)	-	GREEN-BLACK	NON
B1				+12V FOR GAS INJECTORS	-	2xRED-BLACK	CONN 1,2,3,4,5,6,7,8: [VT 2x1]
B2	NON	NON		GAS INJECTOR 7	WTR. GAZ 7	BROWN	CONN 7[VT 2x1] CONN 2[MX/TR: 6x1]
B3	NON			GAS INJECTOR 6	WTR. GAZ 6	RED	CONN 6[VT: 2x1] CONN 2[MX/TR: 6x1]
B4	NON			GAS INJECTOR 5	WTR. GAZ 5	GREEN	CONN 5[VT: 2x1] CONN 2[MX/TR: 6x1]
B5				PETROL INJ. 4 (PETROL INJ. SIDE)	WTR. BENZ 4 WT	BLUE	NON
B6				PETROL INJ. 4 (PETROL ECU SIDE)	-	BLUE-BLACK	NON
B7				PETROL INJ. 3 (PETROL INJ. SIDE)	WTR. BENZ 3 WT	VIOLET	NON
B8				PETROL INJ. 3 (PETROL ECU SIDE)	-	VIOLET-BLACK	NON
C1				GAS INJECTOR 4	WTR. GAZ 4	BLUE	CONN 4[VT: 2x1] CONN 1 or CONN2 [MX/TR: 6x1]
C2				GAS INJECTOR 3	WTR. GAZ 3	VIOLET	CONN 3VT: 2x1 CONN 1[MX/TR: 6x1]
C3				GAS INJECTOR 2	WTR. GAZ 2	YELLOW	CONN 2[VT: 2x1] CONN 1[MX/TR: 6x1]
C4				GAS INJECTOR 1	WTR. GAZ 1	GRAY	CONN 1[VT: 2x1] CONN 1[MX/TR: 6x1]
C5				PETROL INJ. 2 (PETROL INJ. SIDE)	WTR. BENZ 2 WT	YELLOW	NON
C6				PETROL INJ. 2 (PETROL ECU SIDE)	-	YELLOW-BLACK	NON
C7				PETROL INJ. 1 (PETROL INJ. SIDE)	WTR. BENZ 1 WT	GRAY	NON
C8				PETROL INJ. 1 (PETROL ECU SIDE)	-	GRAY-BLACK	NON

# MAIN HARNESS GRAY VERSION 3

Description on connector: **OLNY TYPE 4/6**

**SZ3K 4/6**  
NRSER MM/YY

**SZ3 4/6**  
NRSER MM/YY

HOLE	Type 4/6	FUNCTION	DESCRIPTION ON WIRE	WIRE COLOR	END CONNECTOR
A1		GND FOR TEMPERATURE SENNORS	-	BLACK split 2xBLACK-GREEN	NON
A2		RPM	OBROTY	BROWN-WHITE	NON
A3		LEVEL SENSOR SIGNAL	WSKAŹNIK	WHITE-GREEN	NON
A4		LAMBDA	LAMBDA	VIOLET	NON
A5		GAS TEMPERATURE	TEMP. GAZU	PINK-BLACK	NON
A6		REDUCER TEMPERATURE	TEMP. REDUKTORA	PINK	NON
A7	<b>NON</b>				
A8		AKUMULATOR +12 V	+12V AKUM.	RED-WHITE	NON
B1		+5V FOR PRESSURE SENSOR	-	RED	CONN1: MOLEX 2x2 [1]
B2		VACCUM	-	GREY	CONN1: MOLEX 2x2 [2]
B3		PANEL SWITCH	-	WHITE	NON
B4		PANEL +12V	-	RED	NON
B5		INTERFACE +12V	-	RED	CONN2: MOLEX 4x2 [7]
B6		INTERFACE TX	-	GREEN	CONN2: MOLEX 4x2 [8]]
B7	<b>NON</b>				
B8		+12V GAS VALVES	+ GAZ	BLUE	NON
C1		GND FOR PRESSURE SENSOR	-	BLACK	CONN1: MOLEX 2x2 [4]
C2		PRESSURE	-	BLUE	CONN1: MOLEX 2x2 [3]
C3		PANEL DATA	-	BROWN	NON
C4		PANEL GND	-	BLACK	NON
C5		INTERFACE GND	-	BLACK	CONN2: MOLEX 4x2 [6]
C6		INTERFACE RX	-	YELLOW	CONN2: MOLEX 4x2 [5]
C7		GND GAS VALVES	-	BLUE-BLACK	NON
C8		GND AKUMULATOR	-	BLACK-WHITE	NON

## INJECTORS HARNESS BLACK VERSION 3

Description on connector: XX=MX-MATRIX    \_=K-sleeved  
 XX=VT-VALTEK                    \_=non  
 XX=TR-TAURUS

CZ3\_ 4 XX  
NRSER MM/YY

CZ3\_ 6 XX  
NRSER MM/YY

CZ3\_ 8 XX  
NRSER MM/YY

HOLE	Type 4	Type 6	Type 8	FUNCTION	DESCRIPTION ON WIRE	WIRE COLOR	END CONNECTOR
A1				+12V AFTER IGNITION	+ WTRYSKIWACZ BENZ	RED-GREEN	NON
A2	NON	NON		GAS INJECTOR 8	WTR. GAZ 8	PINK-WHITE	CONN8[VT: 2x1] CONN2[MX/TR: 6x1]
A3	NON	NON		PETROL INJ. 7 (PETROL INJ. SIDE)	WTR. BENZ 7 WT	BROWN	NON
A4	NON	NON		PETROL INJ. 7 (PETROL ECU SIDE)	-	BROEN-BLACK	NON
A5	NON			PETROL INJ. 6 (PETROL INJ. SIDE)	WTR. BENZ 6 WT	RED	NON
A6	NON			PETROL INJ. 6 (PETROL ECU SIDE)	-	RED-BLACK	NON
A7	NON			PETROL INJ. 5 (PETROL INJ. SIDE)	WTR. BENZ 5 WT	GREEN	NON
A8	NON			PETROL INJ. 5 (PETROL ECU SIDE)	-	GREEN-BLACK	NON
B1				+12V FOR GAS INJECTORS	-	RED-BLACK split 2/4/6/8xRED-BLACK	CONN1,2,3,4,5,6,7,8: [VT 2x1]
B2	NON	NON		GAS INJECTOR 7	WTR. GAZ 7	BROWN-WHITE	CONN7[VT 2x1] CONN2[MX/TR: 6x1]
B3	NON			GAS INJECTOR 6	WTR. GAZ 6	RED-WHITE	CONN6[VT: 2x1] CONN2[MX/TR: 6x1]
B4	NON			GAS INJECTOR 5	WTR. GAZ 5	GREEN-WHITE	CONN5[VT: 2x1] CONN2[MX/TR: 6x1]
B5				PETROL INJ. 4 (PETROL INJ. SIDE)	WTR. BENZ 4 WT	BLUE	NON
B6				PETROL INJ. 4 (PETROL ECU SIDE)	-	BLUE-BLACK	NON
B7				PETROL INJ. 3 (PETROL INJ. SIDE)	WTR. BENZ 3 WT	VIOLET	NON
B8				PETROL INJ. 3 (PETROL ECU SIDE)	-	VIOLET-BLACK	NON
C1				GAS INJECTOR 4	WTR. GAZ 4	BLUE-WHITE	CONN4[VT: 2x1] CONN1 or CONN2 [MX/TR: 6x1]
C2				GAS INJECTOR 3	WTR. GAZ 3	VIOLET-WHITE	CONN3VT: 2x1 CONN1[MX/TR: 6x1]
C3				GAS INJECTOR 2	WTR. GAZ 2	YELLOW-WHITE	CONN2[VT: 2x1] CONN1[MX/TR: 6x1]
C4				GAS INJECTOR 1	WTR. GAZ 1	GREY-WHITE	CONN1[VT: 2x1] CONN1[MX/TR: 6x1]
C5				PETROL INJ. 2 (PETROL INJ. SIDE)	WTR. BENZ 2 WT	YELLOW	NON
C6				PETROL INJ. 2 (PETROL ECU SIDE)	-	YELLOW-BLACK	NON
C7				PETROL INJ. 1 (PETROL INJ. SIDE)	WTR. BENZ 1 WT	GREY	NON
C8				PETROL INJ. 1 (PETROL ECU SIDE)	-	GREY-BLACK	NON

# MAIN HARNESS GRAY VERSION 4

Description on connector:

SZ4	4/6
NRSER	MM/YY

SZ4	8
NRSER	MM/YY

HOLE	Type 4/6	Type 8	FUNCTION	DESCRIPTION ON WIRE	WIRE COLOR	END CONNECTOR
A1			GND FOR TEMPERATURE SENSORS	-	BLACK split 2xBLACK-GREEN	NON
A2			RPM	OBROTY	BROWN-WHITE	NON
A3			LEVEL SENSOR SIGNAL	WSKAŹNIK	WHITE-GREEN	NON
A4			LAMBDA	LAMBDA	VIOLET	NON
A5			GAS TEMPERATURE	TEMP. GAZU	PINK-BLUE	NON
A6			REDUCER TEMPERATURE	TEMP. REDUKTORA	PINK-GREEN	NON
A7	NON		PETROL INJ. 8 (PETROL INJ. SIDE)	WTR. BENZ 8 WT	PINK	NON
A8			AKUMULATOR +12 V	+12V AKUM.	RED-WHITE	NON
B1			+5V FOR PRESSURE SENSOR	-	RED	CONN1: MOLEX 2x2 [1]
B2			VACCUM	-	GREY	CONN1: MOLEX 2x2 [2]
B3			PANEL SWITCH	-	WHITE	NON
B4			PANEL +12V	-	RED	NON
B5			INTERFACE +12V	-	RED	CONN2: MOLEX 4x2 [7]
B6			INTERFACE TX	-	GREEN	CONN2: MOLEX 4x2 [8]]
B7	NON		PETROL INJ. 8 (PETROL ECU SIDE)	-		NON
B8			+12V GAS VALVES	+ GAZ	BLUE	NON
C1			GND FOR PRESSURE SENSOR	-	BLACK	CONN1: MOLEX 2x2 [4]
C2			PRESSURE	-	BLUE	CONN1: MOLEX 2x2 [3]
C3			PANEL DATA	-	BROWN	NON
C4			PANEL GND	-	BLACK	NON
C5			INTERFACE GND	-	BLACK	CONN2: MOLEX 4x2 [6]
C6			INTERFACE RX	-	YELLOW	CONN2: MOLEX 4x2 [5]
C7			GND GAS VALVES	-	BLUE-BLACK	NON
C8			GND AKUMULATOR	-	BLACK-WHITE	NON

# INJECTORS HARNESS BLACK VERSION 4

Description on connector: XX=MX-MATRIX  
XX=VT-VALTEK  
XX=TR-TAURUS

**CZ4 4 XX**  
NRSER MM/YY

**CZ4 6 XX**  
NRSER MM/YY

**CZ4 8 XX**  
NRSER MM/YY

HOLE	Type 4	Type 6	Type 8	FUNCTION	DESCRIPTION ON WIRE	WIRE COLOR	END CONNECTOR
A1				+12V AFTER IGNITION	+ WTRYSKIWACZ BENZ	RED-GREEN	NON
A2	NON	NON		GAS INJECTOR 8	WTR. GAZ 8	PINK-WHITE	CONN8[VT: 2x1] CONN2[MX/TR: 6x1]
A3	NON	NON		PETROL INJ. 7 (PETROL INJ. SIDE)	WTR. BENZ 7 WT	BROWN	NON
A4	NON	NON		PETROL INJ. 7 (PETROL ECU SIDE)	-	BROEN-BLACK	NON
A5	NON			PETROL INJ. 6 (PETROL INJ. SIDE)	WTR. BENZ 6 WT	RED	NON
A6	NON			PETROL INJ. 6 (PETROL ECU SIDE)	-	RED-BLACK	NON
A7	NON			PETROL INJ. 5 (PETROL INJ. SIDE)	WTR. BENZ 5 WT	GREEN	NON
A8	NON			PETROL INJ. 5 (PETROL ECU SIDE)	-	GREEN-BLACK	NON
B1				+12V FOR GAS INJECTORS	-	RED-BLACK split 2/4/6/8xRED-BLACK	CONN1,2,3,4,5,6,7,8: [VT 2x1]
B2	NON	NON		GAS INJECTOR 7	WTR. GAZ 7	BROWN-WHITE	CONN7[VT 2x1] CONN2[MX/TR: 6x1]
B3	NON			GAS INJECTOR 6	WTR. GAZ 6	RED-WHITE	CONN6[VT: 2x1] CONN2[MX/TR: 6x1]
B4	NON			GAS INJECTOR 5	WTR. GAZ 5	GREEN-WHITE	CONN5[VT: 2x1] CONN2[MX/TR: 6x1]
B5				PETROL INJ. 4 (PETROL INJ. SIDE)	WTR. BENZ 4 WT	BLUE	NON
B6				PETROL INJ. 4 (PETROL ECU SIDE)	-	BLUE-BLACK	NON
B7				PETROL INJ. 3 (PETROL INJ. SIDE)	WTR. BENZ 3 WT	VIOLET	NON
B8				PETROL INJ. 3 (PETROL ECU SIDE)	-	VIOLET-BLACK	NON
C1				GAS INJECTOR 4	WTR. GAZ 4	BLUE-WHITE	CONN4[VT: 2x1] CONN1 or CONN2 [MX/TR: 6x1]
C2				GAS INJECTOR 3	WTR. GAZ 3	VIOLET-WHITE	CONN3VT: 2x1 CONN1[MX/TR: 6x1]
C3				GAS INJECTOR 2	WTR. GAZ 2	YELLOW-WHITE	CONN2[VT: 2x1] CONN1[MX/TR: 6x1]
C4				GAS INJECTOR 1	WTR. GAZ 1	GREY-WHITE	CONN1[VT: 2x1] CONN1[MX/TR: 6x1]
C5				PETROL INJ. 2 (PETROL INJ. SIDE)	WTR. BENZ 2 WT	YELLOW	NON
C6				PETROL INJ. 2 (PETROL ECU SIDE)	-	YELLOW-BLACK	NON
C7				PETROL INJ. 1 (PETROL INJ. SIDE)	WTR. BENZ 1 WT	GREY	NON
C8				PETROL INJ. 1 (PETROL ECU SIDE)	-	GREY-BLACK	NON

# MAIN HARNESS GRAY VERSION 5

Description on connector:

<b>SZ5</b>	<b>4/6</b>
<b>NRSER</b>	<b>MM/YY</b>

<b>SZ5</b>	<b>8</b>
<b>NRSER</b>	<b>MM/YY</b>

HOLE	Type 4/6	Type 8	FUNCTION	DESCRIPTION ON WIRE	WIRE COLOR	END CONNECTOR
A1			GND FOR TEMPERATURE SENSORS	-	BLACK split 2xBLACK-GREEN	NON
A2			RPM	OBROTY / RPM	BROWN-WHITE	NON
A3			LEVEL SENSOR SIGNAL	WSKAŹNIK / GAS LEVEL	WHITE-GREEN	NON
A4			LAMBDA	LAMBDA	VIOLET	NON
A5			GAS TEMPERATURE	TEMP. GAZU / GAS TEMP.	PINK-BLUE	NON
A6			REDUCER TEMPERATURE	TEMP. REDUKTORA / REDUCER TEMP.	PINK-GREEN	NON
A7	NON		PETROL INJ. 8 (PETROL INJ. SIDE)	WTR. BENZ 8W / PETROL INJ. 8W	PINK	NON
A8			AKUMULATOR +12 V	+12V AKUM. / +12V BATTERY	RED-WHITE	NON
B1			+5V FOR PRESSURE SENSOR	+5V CZUJ. / +5V SENS.	RED	CONN1: MOLEX 2x2 [1]
B2			VACCUM	PODCISNIENIE / VACCUM	GREY	CONN1: MOLEX 2x2 [2]
B3			PANEL SWITCH	PANEL PRZYCISK / PANEL SWITCH	WHITE	NON
B4			PANEL +12V	PANEL +12V	RED	NON
B5			INTERFACE +12V	INTERFEJS +12V / INTERFACE +12V	RED	CONN2: MOLEX 4x2 [7]
B6			INTERFACE TX	INTERFEJS TX / INTERFACE TX	GREEN	CONN2: MOLEX 4x2 [8]]
B7	NON		PETROL INJ. 8 (PETROL ECU SIDE)	WTR. BENZ 8S / PETROL INJ. 8S		NON
B8			+12V GAS VALVES	+12V ZAWOR GAZOWY / +12V GAS VALVE	BLUE	NON
C1			GND FOR PRESSURE SENSOR	-	BLACK	CONN1: MOLEX 2x2 [4]
C2			PRESSURE	CIŚNIENIE / PRESSURE	BLUE	CONN1: MOLEX 2x2 [3]
C3			PANEL DATA	PANEL DATA	BROWN	NON
C4			PANEL GND	-	BLACK	NON
C5			INTERFACE GND	-	BLACK	CONN2: MOLEX 4x2 [6]
C6			INTERFACE RX	INTERFEJS RX / INTERFACE RX	YELLOW	CONN2: MOLEX 4x2 [5]
C7			GND GAS VALVES	MASA ZAWOR GAZ / GND VALVE	BLUE-BLACK	NON
C8			GND AKUMULATOR	-	BLACK-WHITE	NON

# INJECTORS HARNESS BLACK VERSION 5

Description on connector: XX=MX-MATRIX

XX=VT-VALTEK

XX=TR-TAURUS

<b>CZ5</b>	<b>4 XX</b>
<b>NRSER</b>	<b>MM/RR</b>

<b>CZ5</b>	<b>6 XX</b>
<b>NRSER</b>	<b>MM/RR</b>

<b>CZ5</b>	<b>8 XX</b>
<b>NRSER</b>	<b>MM/RR</b>

HO LE	Type 4	Type 6	Type 8	FUNCTION	DESCRIPTION ON WIRE	WIRE COLOR	END CONNECTOR
A1				+12V AFTER IGNITION	+12V PO ZAPŁONIE / +12V AFTER IGNITION	RED-GREEN	NON
A2	NON	NON		GAS INJECTOR 8	WTR. GAZ 8 / GAS INJ. 8	PINK-WHITE	CONN8[VT: 2x1] CONN2[MX/TR: 6x1]
A3	NON	NON		PETROL INJ. 7 (PETROL INJ. SIDE)	WTR. BENZ 7W / PETROL INJ. 7W	BROWN	NON
A4	NON	NON		PETROL INJ. 7 (PETROL ECU SIDE)	WTR. BENZ 7S / PETROL INJ. 7S	BROEN-BLACK	NON
A5	NON			PETROL INJ. 6 (PETROL INJ. SIDE)	WTR. BENZ 6W / PETROL INJ. 6W	RED	NON
A6	NON			PETROL INJ. 6 (PETROL ECU SIDE)	WTR. BENZ 6S / PETROL INJ. 6S	RED-BLACK	NON
A7	NON			PETROL INJ. 5 (PETROL INJ. SIDE)	WTR. BENZ 5W / PETROL INJ. 5W	GREEN	NON
A8	NON			PETROL INJ. 5 (PETROL ECU SIDE)	WTR. BENZ 5S / PETROL INJ. 5S	GREEN-BLACK	NON
B1				+12V FOR GAS INJECTORS	+12V WTR. GAZOWYCH / +12V GAS INJ.	RED-BLACK split 2/4/6/8xRED-BLACK	CONN1,2,3,4,5,6,7,8: [VT 2x1]
B2	NON	NON		GAS INJECTOR 7	WTR. GAZ 7 / GAS INJ. 7	BROWN-WHITE	CONN7[VT 2x1] CONN2[MX/TR: 6x1]
B3	NON			GAS INJECTOR 6	WTR. GAZ 6 / GAS INJ. 6	RED-WHITE	CONN6[VT: 2x1] CONN2[MX/TR: 6x1]
B4	NON			GAS INJECTOR 5	WTR. GAZ 5 / GAS INJ. 5	GREEN-WHITE	CONN5[VT: 2x1] CONN2[MX/TR: 6x1]
B5				PETROL INJ. 4 (PETROL INJ. SIDE)	WTR. BENZ 4W / PETROL INJ. 4W	BLUE	NON
B6				PETROL INJ. 4 (PETROL ECU SIDE)	WTR. BENZ 4S / PETROL INJ. 4S	BLUE-BLACK	NON
B7				PETROL INJ. 3 (PETROL INJ. SIDE)	WTR. BENZ 3W / PETROL INJ. 3W	VIOLET	NON
B8				PETROL INJ. 3 (PETROL ECU SIDE)	WTR. BENZ 3S / PETROL INJ. 3S	VIOLET-BLACK	NON
C1				GAS INJECTOR 4	WTR. GAZ 4 / GAS INJ. 4	BLUE-WHITE	CONN4[VT: 2x1] CONN1 or CONN2 [MX/TR: 6x1]
C2				GAS INJECTOR 3	WTR. GAZ 3 / GAS INJ. 3	VIOLET-WHITE	CONN3VT: 2x1 CONN1[MX/TR: 6x1]
C3				GAS INJECTOR 2	WTR. GAZ 2 / GAS INJ. 2	YELLOW-WHITE	CONN2[VT: 2x1] CONN1[MX/TR: 6x1]
C4				GAS INJECTOR 1	WTR. GAZ 1 / GAS INJ. 1	GREY-WHITE	CONN1[VT: 2x1] CONN1[MX/TR: 6x1]
C5				PETROL INJ. 2 (PETROL INJ. SIDE)	WTR. BENZ 2W / PETROL INJ. 2W	YELLOW	NON
C6				PETROL INJ. 2 (PETROL ECU SIDE)	WTR. BENZ 2S / PETROL INJ. 2S	YELLOW-BLACK	NON
C7				PETROL INJ. 1 (PETROL INJ. SIDE)	WTR. BENZ 1W / PETROL INJ. 1W	GREY	NON
C8				PETROL INJ. 1 (PETROL ECU SIDE)	WTR. BENZ 1S / PETROL INJ. 1S	GREY-BLACK	NON