APP STUDIO

Agis Controller MANUAL

Agis

www.appstudio.pl

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1. Connecting Agis controller to PC

An interface cable is required to connect the controller to diagnostic application. Every USB interface cable produced by AppStudio is compatible with AGIS P13, as well as older controllers, namely AGIS, ALTIS, AGIS OBD/CAN, AGIS MINI, AGIS M210, and AGIS D12.

Drivers dedicated to the given type of cable interface must be installed in order to assure proper operation of the interface. Drivers are available at the AppStudio website. COM port of the interface is selected automatically each time controller is connected to the application. If the controller cannot establish communication with the application, check if the interface is displayed on the list in the following location:

PORT COM/DEVICE MANAGER/PC.

In some cases, the interface

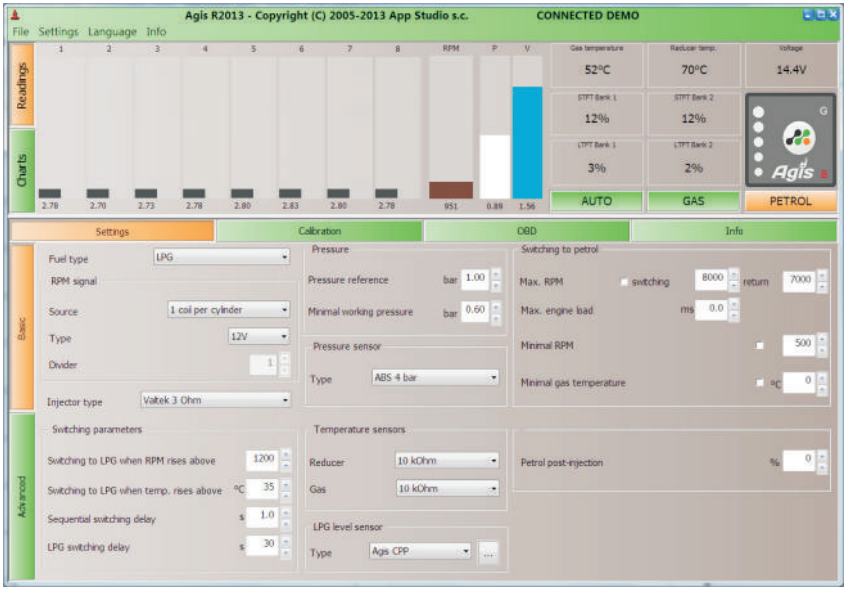
BT/BLUETOOTH/

installed in the PORT COM higher than the controller interface may render communication between the controller and the application impossible. In such cases, BT interface must be switched off.

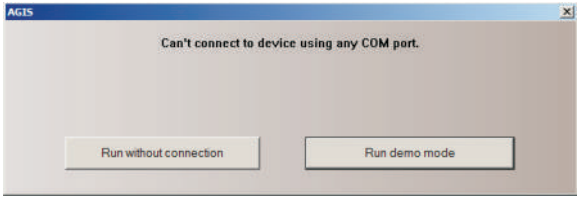
Once interface installation is completed, application can be started.

Turn on the vehicle ignition. Once started, the application will automatically check all enabled COM ports and identify installed interface.

The application starts on the **BASIC SETTINGS** tab.



The controller's application can be started when **not connected to PC** or in **DEMO** mode. Either of those options can be selected.



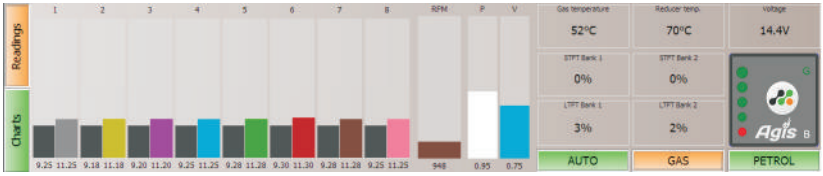
2. User interface description

User interface application was designed and arranged in such a way that all basic functions were located in one window, without having to switch between tabs.

The interface application screen is divided into several windows.

2.1 Information window

Information window is located at the top of the screen and configuration window is at the bottom. Information window is displayed permanently and independently of the configuration window located at the bottom of the screen.



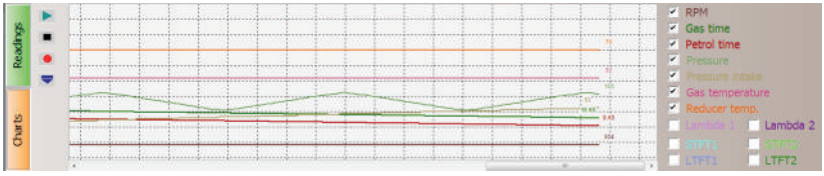
The information window contains the following operating parameters:

- **petrol injectors opening times** shown in black (bar graph and digital display)
- **LPG injectors opening times** shown in orange (bar graph and digital display)
- **engine speed** shown in green (bar graph and digital display)
- **vacuum in suction manifold** (in bars) shown in navy blue (bar graph and digital display)
- **operating pressure** (in bars) shown in blue (bar graph and digital display)
- **LPG temperature and reducer temperature**
- **system voltage**
- **OBD settings loading**, on the basis of ECU settings
- B/G switch showing active feeding mode and level of LPG in the tank
- **AUTO/LPG/PETROL mode switch**, operating mode is indicated by its activity - current mode buttons are highlighted in orange.

Information window also include recording feature. Upon pressing the button GRAPHS on the Information Window, reading of selected parameters is started. When the application is closed, diagnostic file is automatically saved to diagnostic folder located at

My Documents\AGIS\Diag

When you are in doubt or have problem with diagrams interpretation you can send the file, together with settings data and hardware information, for analyses. Current email addresses are available at www.appstudio.pl.



2.2 Settings window

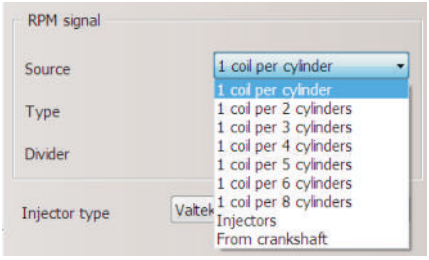
The window was divided into setting tabs. Number of tabs was limited to avoid unnecessary switching between tabs. Functions are grouped so that one tab contains basic and frequently used functions, which are required for initial adjustment of a vehicle.

2.3 Basic settings

Fuel type - LPG mode by default. Changes control algorithms dedicated to CNG and highlight color to distinguish CNG from LPG.

RPM signal - selection of engine speed signal source, depending on the type of ignition system. There are several options and all of them but the last one require cable connection. RPM signal cable can be connected to: ignition coil, injector, crank shaft position sensor, cam shaft position sensor, engine speed indicator.

The injector option does not require cable connection as the output is calculated on the basis of vacuum value and injector opening time. If this type of signal source gives incorrect readings divisor must be utilised to adjust RPM readings.

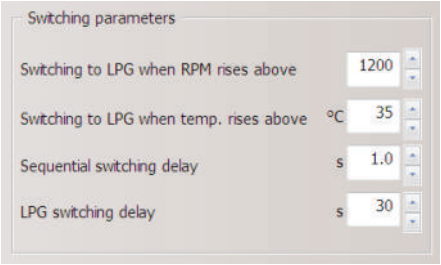


- **Type** - signal sensitivity, voltage threshold above which RPM signal will not be recognised. The value is to be selected depending on the RPM signal source.
- **Divider** - this feature allows to determine correct RPM reading when selecting RPM signal from crank shaft position sensor, cam shaft position sensor or injector.

Injector type - active window that enables selection of any injector from the list. After selecting a given type of injector, its voltage characteristic and heating parameters are filled in automatically in the **Advanced** settings tab.

Switching parameters - basic parameters of the system settings.

- **switching to LPG when RPM raises above** - engine speed at which switch to other fuel is performed if switchover temperature or heating turn-off temperature is reached.
- **switching to LPG when temp. raises above** - temperature of the reducer proving that liquid LPG was vaporised and can be forwarded to the manifold via gas injectors.
- **sequential switching delay** - this feature enables sequential switchover between both types of fuel in preset time, eg. each cylinder after 1s. If the delay is set to 0 s, all cylinders will be switched at the same time.
- **LPG switching delay** - for cold engine only. Additional time lag before switchover to LPG, even if switchover temperature and RPM is reached. Value of this parameter can be set to 0.



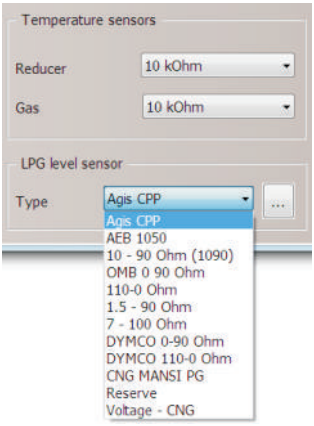
PRESSURE

- **Pressure reference** - pressure measured after the reducer, calculated automatically in the calibration process
- **Minimal working pressure** - pressure at which automatic switchover to petrol is triggered. The pressure is calculated automatically as 60% of the working pressure.

Pressure sensor - Type - default type of sensor selected in application. Sensor currently used in the system is an absolute sensor MPXHZ6400A but it is also possible to use differential sensor PS4250DP. Sensor type must be changed in settings in order to obtain correct working pressure reading. Pressure sensor PS4250DP is not able to detect vacuum as a separate pressure value, so if vacuum is detected, displayed pressure value is 1 bar.

Temperature sensors - Components delivered by Appstudio in kits are always set as default ones. It is very important to check and select correct values for the sensors that were not delivered as part of the kit. Different sensors will affect the switch point (for the reducer temperature sensor) and allowance based on LPG temperature (in case of LPG temperature sensor). The application allows to select between the 4 most popular sensors' values, from 2,2 kOhm to 10 kOhm.

LPG level sensor – type of level sensor installed in the tank must be selected to assure reliable LPG level indication. Normally, the LPG level sensors placed in the list are calibrated to mate with Tomasetto multivalve. If the LPG level indication is inaccurate or incorrect, it is possible to adjust given LPG level sensor manually. Manual adjustment of sensors can be performed in the window that pops up when type of sensor is selected.



LPG level is shown in the window above the editable windows with fuel levels. LPG level, as well as minimum and maximum level range can be checked by changing setting of the sensor on the multivalve and inserting value for the given LPG level. On completion of the above manual calibration, LPG level indication should be accurate.

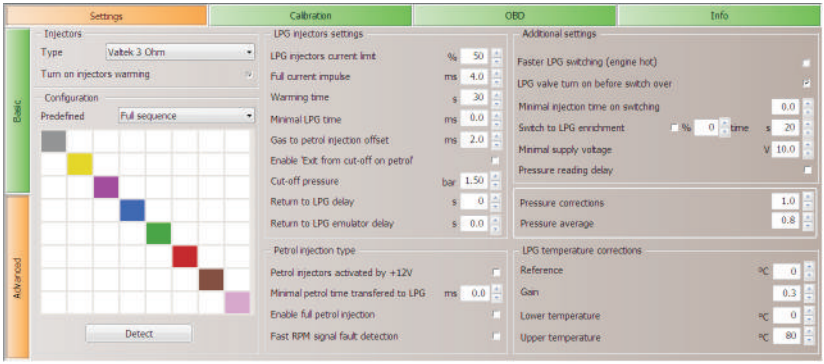
There are two types of LPG level sensors: mechanical and electronic. They can be easily identified by the casing or number of wires in the harness that come from the sensor. Two wires and a pointer indicate mechanical sensor, whereas LEDs and three wires indicate electronic sensor. Electronic sensor requires separate power supply. Generally, the controller is equipped with three wires for connecting mechanical or electronic sensors. If the sensor is equipped with less than three wires, the remaining ones must be isolated. If sensor harness consists of only one or two wires (signal or signal+ground) then, in case of electronic sensor, it can be powered from solenoid valve located in the multivalve. In such case the following option must be selected: **Level sensor suppllied from valve**.

Switching to petrol - Group of parameters that is useful in case injectors or reducer are not fully operational. They enable to set a maximum RPM threshold at which switchover to petrol feeding is initiated.

- **Max. RPM** - any value can be set here but **return** to LPG feeding must have lower value the **Max. RPM** parameter
- **Max. engine load** - limit of LPG injectors opening time, in order to avoid damage and still keep them controllable. Threshold value of switchover to petrol is set to 40 ms.
- **Minimal RPM** - minimum RPM at which switchover to LPG is triggered. This feature is used for irregular idle speed caused by slow responding injectors or non-linear fuel demand at the shortest opening times.
- **Minimal gas temperature** - in order to prevent injection of liquid LPG, at very low temperature of heater, it is possible to set a minimum LPG temperature at which switchover to petrol is initiated.

2.4 Advanced settings

Advance settings is another group of features for advanced LPG systems assemblers, who are experienced enough to diagnose malfunctions and adjust system settings.

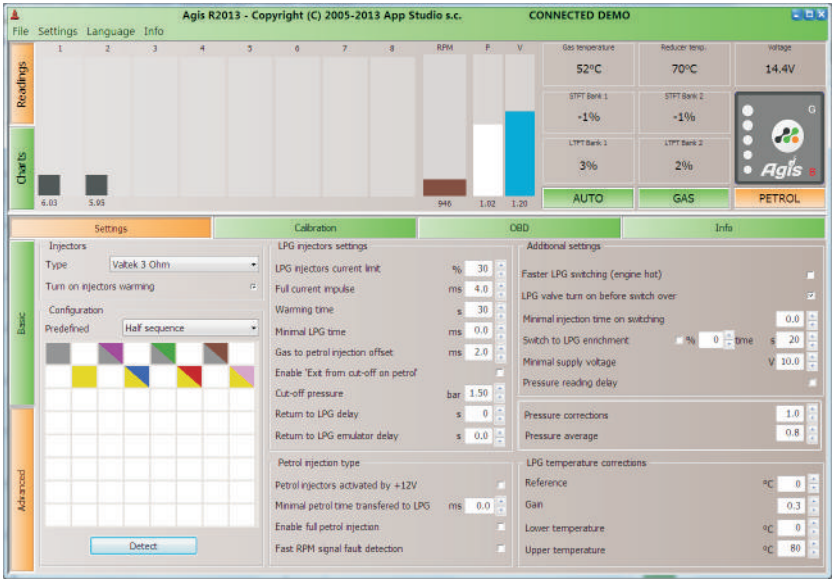


The tab contains additional features like injectors adjustment, petrol injection, operation control, reducer adjustment and pressure and temperature adjustments.

2.5 Injectors

This tab contains the same choice of injectors as in the **BASIC SETTINGS** tab, so return to the previous tab is not required. Injector heating function is activated by default. Heating parameters are displayed on the right side, in the **"Lpg injector settings"** window.

- **Configuration/predefined** - the window contains both diagnostic and setting features. Petrol injectors (irrespective of injector type) are separated with emulators and it is possible to change control of the LPG injectors, as well as to turn off any number of LPG injectors permanently. Once **Detect** button is pressed, the system wil automatically identify type of the petrol injection system (full sequence, half sequence, full group) and display appropriate configuration in the INFORMATION WINDOW.



- **Turn on injectors warming** - this feature enables heating LPG injectors when the vehicle is still powered with petrol. Initial warm-up of the injector is executed by fast opening and closing the injectors in such a way the amount of LPG entering engine does nor affect petrol-air mixture ratio. When the warm-up phase is completed, switchover to LPG is triggered. Injectors heating parameters are loaded automatically on selection of the injector type. Impulse parameter is not visible to user but it is normally set to half an impulse. The only value that can be modified by the user is warm-up time, which is the additional period of time after the automatic switchover temperature is reached.
- **Minimal LPG time** - Minimal LPG time - this feature allows to install slow gas injectors in cars with short petrol injection times. Treshold should be set to lowest, safe opening time, allowing full opening of LPG injector Once treshold reached, LPG injection time will not be shortened anymore.
- **Gas to petrol injection offset** - permanent offset of the LPG injection start point, in relation to the petrol injection beginning.

- **Enable 'Exit from cut-off on petrol'** - this function enables to eliminate temporary reducer and injectors malfunction when in cut-off mode. When in cut-off mode, LPG injectors are closed and valve in the reducer is opened. As a result, pressure of LPG in the system may increase. Each type of LPG injector has maximum allowable operating pressure and when the pressure is exceeded it does not open. Consequently, increased pressure of LPG in the system may cause problems with injectors opening, irregular operation of the engine and stalls. At that critical moment, it is possible to switch to petrol, depressurise the LPG feeding system and switch back to LPG. Switch to petrol pressure, depressurisation time and sequence of successive cylinders switchover to LPG must be entered in this function.

2.6 Petrol injection system

- **Petrol injectors activated by +12 V** - this option is required to change signal polarity of the petrol injector if non-standard signal polarity is identified in the vehicle. Normally, fuel injector initiating signal is sent via the vehicle ground. In some cases, however, polarity is inverted.

  How to recognise inverted polarity?

  When engine is running idle on petrol, displayed injection times are significantly long (greater than 100ms but lower at higher engine speed). If this option is activated, shorter times should appear in the window.

  This option is inactive by default.
- **Minimal petrol time transfered to LPG** - this feature enables to set length of impulse that should be ignored in the LPG injectors control process (will be cut out). This function is helpful for some Mazda and Rover engines, as well as engines with not fully developed cut-off mode.
- **Enable full petrol injection** - this feature enables to control LPG injectors when petrol injectors are permanently opened (above certain engine speed). For instance, at the engine speed 5000 RPM injection time above 20ms switches to continuous mode.

  Normally, in such engine conditions (no impulses on petrol injectors) Agis controller automatically cuts off LPG feeding. If this feature is active, Agis controller switches to the continuous injection mode preventing engine stall. This feature is commonly used in “tuned” cars, but may also be found in non-modified, series-built cars (e.g. Pugeot 407 2.2 l from 2007, Peugeot 206 1.1 of 2000).

  This option is deactivated by default and 99% of vehicles do not require to activate it.

  How to recognise the continuous injection of petrol? In Agis aplications times of injection will disappear around 4500 RPM (no impulses to injectors, petrol injectors continuously opened until the engine speed stops rising).
- **Fast RPM signal fault detection** - this feature is helpful in case power supply +12V is taken from the location, where voltage is still maintained after ignition is off. This may cause addition LPG injection during engine shut-off. This method of power connection may cause problems with restarting the engine right after it's stopped. If the feature is activated and the engine speed is lower than 400 RPM, controller is automatically turned off, so LPG is not injected during the engine shut off phase.

2.7 Additional control algorithms

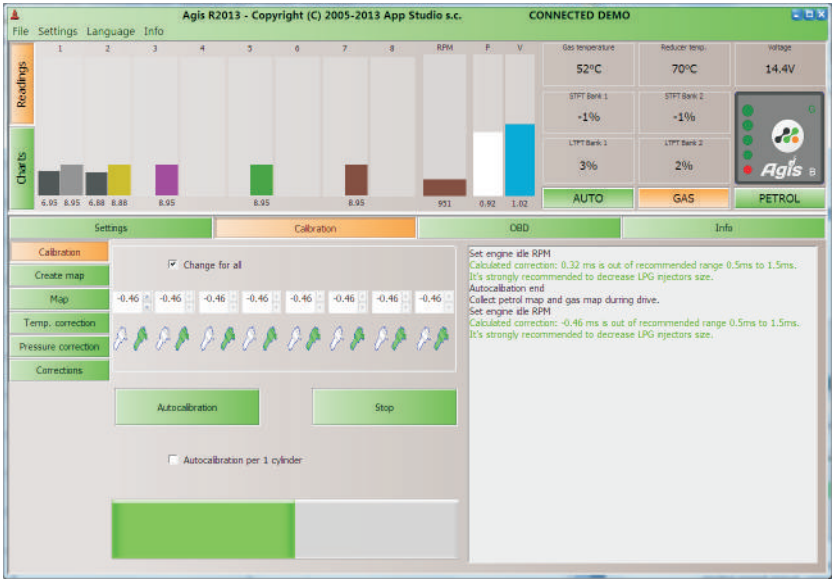
- **Faster LPG switching (engine hot)** - it the engine is stopped and temperature of the reducer allows automatic switchover to LPG, engine is started immediately on LPG.
- **LPG valve turn on before switch over** - this feature is useful in low temperature conditions. It prevents reducer damage by switching on the LPG not earlier that reducer reaches automatic switchover temperature.

- **Minimal injection time on switching** - this feature is useful when incompatible injectors are installed, especially when short petrol injection times on idle are identified. Switchover parameter is set according to those conditions. Additionally, this feature enables setting dependence between switchover and the minimum petrol injection time of the injector to be adjusted.

  As a result, three conditions must be fulfilled here to initiate switchover (temperature of automatic switchover, RPM and minimum petrol injection time).
- **Switch to LPG enrichment** - this feature enables to control volume of injected gas at the first switchover from petrol to gas if the reducer's heater does not work properly.
- **Minimum supply voltage** - nominal parameter defining minimum voltage required to power the entire LPG feeding system. If the voltage drops below preset threshold, the LPG system is switched off automatically.
- **Pressure reading delay** - activation of this feature causes ignoring pressure allowances on switchover to LPG.
- **Pressure corrections** - this feature enables enriching of the mixture when pressure in the rail dropping. This is a quick electronic correction triggering automatic increase of injection times, depending on the pressure drop level. Value “1” translates to 10% correction.
- **Pressure average** - the value defining pressure and vacuum sampling frequency. This option enables to average values of pressure in order to prevent unnecessary corrections.
- **LPG temperature corrections** - set of algorithms that controls continuous corrections of injectors opening time, depending on the gas temperature. The algorithm was written in such manner to keep the mixture ratio close to ideal within the entire range of operating temperatures.
- **Reference** - reference temperature, base for calculation
- **Gain** - bias algorythm of 0,3 means that every change of temperature by 1 degree, starting from 0, initiates 0,3 % adjustment. So, if the temperature changes by 20 degree, the the injector opening time allowance equals 6%.
- **Lower temperature** - the minimum temperature taken for correction
- **Upper temperature** - the maximum temperature taken for correction

3. Autocalibration - adjustment

Autocalibration is the initial adjustment of the LPG system to a given engine and other vehicle components. The user is asked to follow messages displayed on the screen.



First the following parameters must be selected: engine speed signal, connection parameters, temperature sensors (if other than delivered in the kit), LPG level sensor, LPG injector mode. When all the above are selected and determined, process of autocalibration can be started. To initiate the process, press AUTOCALIBRATION Button and leave the vehicle engine running on idle. Cars with Automatic transmission should be calibrated on 'Drive' with parking brake activated.

The system will start switching over to LPG and back to petrol to calculate the main allowance. This is the first parameter of adjustment that defines the difference between opening times of petrol and LPG injectors for the entire range of injectors' operation.

It's important the calculated parameter "Main correction" is within the recommended range.

Additionally, for cars having short fuel injection time (shorter than 2.5ms when idle and shorter than 15ms while driving), recommended correction should be closer to the bottom threshold of the recommended value. That principle should be applied mainly to Japanese cars, especially to Mazda.

In case of 4-cylinder engines, autocalibration normally takes between 10 and 20 seconds and, if successful, another message is displayed on the screen. The next stage of autocalibration is creation of a map showing performance of the system in relation to momentary engine load. This type of calibration is called mapping and the best method to perform the mapping is while driving or on the test bench.

In order to start mapping procedure, select function **Create map** in the **CALIBRATION** tab, press the button **Erase petrol map**, and **Erase gas map** and then start driving on petrol. System will immediately start collecting required data (start mapping), which is signalised with orange vertical bars that are growing as the system collects the data. When the bar reach the top level, mapping can be considered complete and vehicle can be switched over to LPG. Continue driving to collect

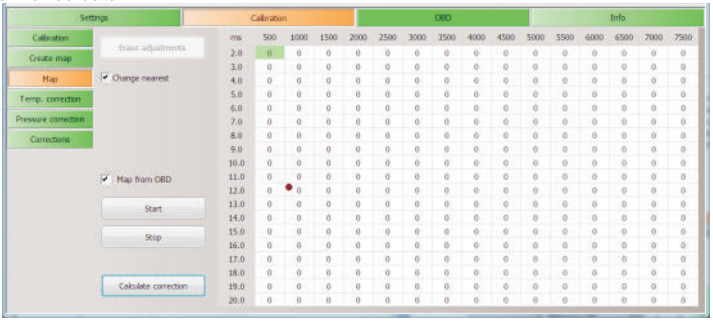
points and complete mapping for LPG. For LPG, number of points collected is indicated by green vertical bar. When system decides that number of points that have been collected for both maps is sufficient, saving request will be displayed and the correction map will be saved in a form of black line. If the saved map of corrections does not contain any sharp slopes or declines it can be considered correct. The map may be edited and corrected manually at any time. To correct the map manually, move the blue point with keyboard arrows (right and left) and confirm preferred location of the blue point with the ENTER key. Use arrows (up and down) to change location of the map in a given point. Allowable scope of change for each point of the map is +- 50%. It is not recommended to introduce any changes greater than 20- 25% within a given scope. It such changes are required, it is recommended to replace injectors' nozzles with a new set of higher diameter. If nozzles of higher diameter are not available, preset pressure on the reducer must be increased.

AUTOMAPING

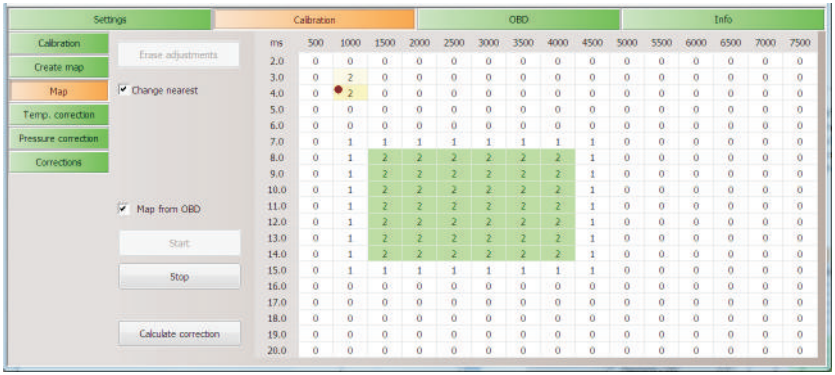
System is equipped with auto adjustment feature that adjust performance parameters each time preset number of kilometres is reached. System triggers the mapping procedure automatically and, on the basis of previously saved “base map”, maps the vehicle performance again while driving on LPG and introduce corrections to the base map. The procedure will be initiated automatically when the time interval defined in the window MAPPING elapses.

Map - System also allows to perform mapping with OBD settings of the main ECU of the vehicle. Upon connecting the AGIS P13 controller to the diagnostic port (see harness diagram), OBD settings can be implemented for accurate mapping of all points, exactly the same manner as it is done for petrol. When the function **Change nearest** is enabled, system will “smooth” the values in adjacent cells in order to prevent sharp increases of values resulting from borrowing mapping data from OBD.This method of mapping does not require driving on petrol but on LPG only. Each point must be mapped as long as the percentage value difference of the point is negligible or values in the cells are not changing. When that happens, the cell is highlighted red or close to red. This method of mapping can be performed many times.

Every next mapping process does not erasure the previously saved data but simply corrects it with fresh performance data.

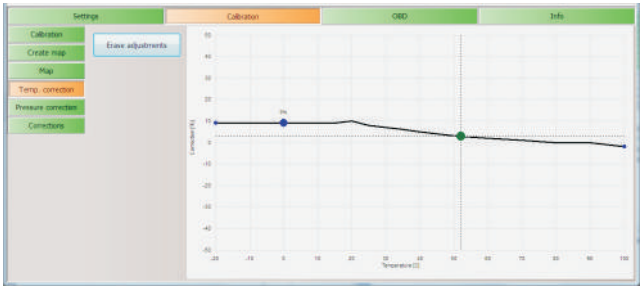


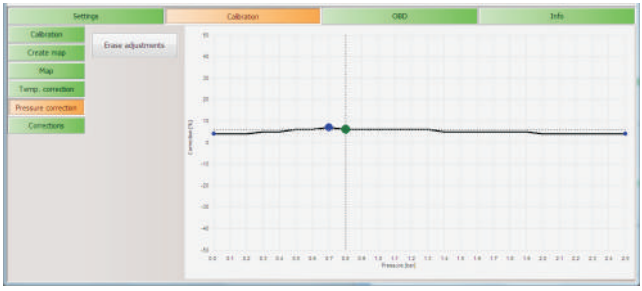
This method of mapping is also suitable for manual map modification by more advanced system assemblers. To mark the check box, press SHIFT and select the box using keyboard arrows. Enter correction value for the marked box by pressing CTRL key and up and down arrows until preferred value appears. Also, it is possible to change scales for injectors' opening times and the engine speed value. Double-click on the scale point to highlight it blue and edit. When edited, values can be



For more advanced users, option of creating LPG pressure and temperature was added, as a complement to automatic adjustments stored in the controller's memory.

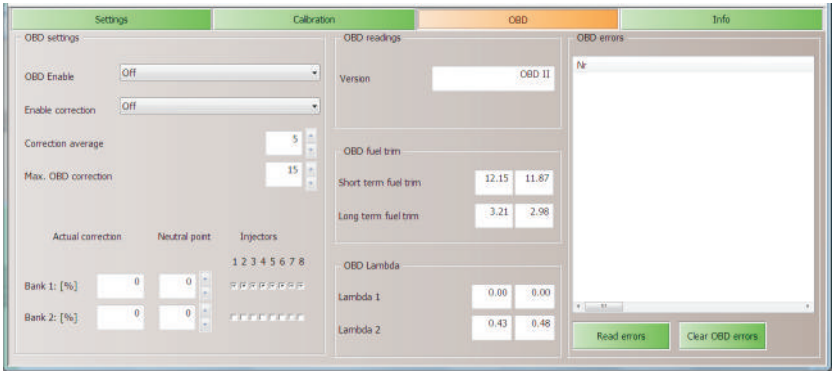
Selection of the correction point and implementation of the correction is performed according to the same rules as for adjustment of correction maps. Values are set and selected by means of arrows and the ENTER keys.





4. OBD features

Agis P13 controller in OBD version is equipped with advanced interface, enabling connection to diagnostic port of the vehicle. ODB parameters can be transmitted both via the CAN bus and analog data transfer (ISO and KWP protocols). Thus, continuous reading and perpetual adjustment of the mixture ratio is possible by automatic modification of the original OBD settings. This feature makes the system self-operating and user's maintenance is limited to periodical check of components condition and filters replacement.



Connection to OBD port.

Harness of AGIS P13 controller contains three wires dedicated for connection of the controller to OBD.

CAN protocols:

white - pin 6 CAN H

yellow - pin 14 CAN H

Protocols ISO/KWP

blue - pin 7 K-line

green - pin 15 L-line

Type of data transmission and type of protocol can be checked with diagnostic scanner that immediately identifies the wires and shows the proper way of connection. If scanner is not available, cables can be identified by arrangement of pins in the vehicle diagnostic port.

If the diagnostic port contains only pin 6 and 14, whereas pin 7 and 15 are missing, only CAN transmission is possible, but if the pin 5 or/and 17 are present in the port, transfer via ISO/KWP protocols is also available. List of vehicles and supported protocols are available at our website: www.appstudio.pl

4.1 Connection to OBD

Built-in ODB system of the AGIS P13 controller must be activated in the OBD tab

by pressing ON in the OBD Enable panel. Controller will establish communication with ECU providing type of protocols, type and speed of transmission, long and short term settings, oxygen sensor data before and after the catalytic converter, depending on the number of data bank of the specific ECU.

If several devices are connected simultaneously, external devices and diagnostic devices are always prioritized when communication is being established. In this case, the controllerAGIS P13 is switched to inactive mode of OBD reading and OBD data will not be displayed.

If AGIS controller establishes communication as the first device and communication with other test equipment is impossible, OBD feature should be deactivated in application. On older protocols (KWP and ISO), full deactivation of LPG system might be required (remove main fuse) or OBD connection cables should be deattached..

- **Correction average** - parameter defining interval of OBD settings reading
- **Max. OBD correction** - maximum allowable scope of adjustment for the specific type of vehicle
- **Neutral point** - original basic point of OBD corrections for most vehicles. Correct long term adjustment fluctuates around 0%.

When the controller established communication with the vehicle OBD and all initial readouts are correctly displayed, function of automatic correction on the basic of data acquired from OBD can be enabled. This function enables continuous and automatic adjustment of the engine operating parameters when driving on LPG to the original ECU parameters. LPG controller is constantly monitoring differences between the ODB settings and original ECU settings (constant ODB adjustment). All differences identified in particular time interval are transmitted to the engine ECU with adjustment request, so the engine operating parameters modified while driving on gas are changed back immediately to original level.

Parameters adjustment for multi-cylinder engines comprising many data banks is performed independently for each data bank. In such case, it is necessary to determine which cylinders are coupled with respective data banks, since separation of petrol injectors with emulators are done in the same order as petrol injectors allocated to the given data bank. In autocalibration tab, select the function **ONE ADJUSTMENT FOR ALL CYLINDERS**, and increase gradually adjustment for all cylinders, one by one, at the same time checking short time settings values. Change of short time setting to negative value signalise allocation of a cylinder to particular data bank.

Allocation of all cylinders to a given data bank must be defined after checking all injectors.

Controller application update that makes the task automatically during the calibration process will soon be available.

AGIS P13 controller can also diagnose ECU of the vehicle. AGIS P13 controller application enables to read ODB error codes of ECU and error codes deletion if required. This function is enabled by pressing READ ODB ERRORS, CLEAR ODB ERRORS.

Agis controller has an option of automatic cleaning of OBD error codes.

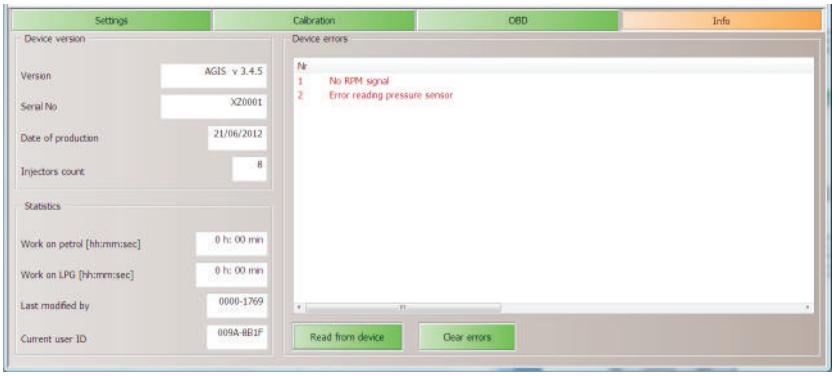
That option is under the "Advanced" button in the OBD tab.

Described below functions of the controller make it unrivalled on the market, as far as the clarity of operation and available features are concerned. OLED diagnostic console will be soon available. The console enables to screen several parameters of the controller at the same time without having to connect the interface application.

5. Controller information

This tab contains information about controller, firmware version, serial number, manufacture date, number of injectors supported, statistics on times of operation on petrol and LPG, number of adjustments introduced as well as identifier of the person who introduced modifications and the first connection details.

The tab also constitutes diagnostic interface for the LPG controller. All error related to system malfunctions can be read in this tab. It enables the user to identify and correct all possible errors in fast and easy manner. List of error codes is printed on the last page of the present Manual.

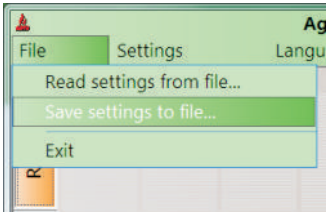


6. Save data to file/loading settings

All settings and application data can be saved to a file and used later for setting the same types of vehicles, without having to calibrate and map them from scratch. Safe the file containing settings, clicking in the left top corner, pane FILE/SAFE SETTINGS TO FILE.

Enter the file name and click SAVE. When the first file is saved, a new folder is on the C: drive is created automatically and all data files are stored there. Path to the folder is as follows:

My Documents\AGIS\Settings



Loading settings from the file is executed the same way, i.e. file must be found in the folder and opened. Data from the file will be downloaded to the controller automatically.

6.1 Restoring factory settings

Restoring factory settings is a safety feature provided in case controller crashes and does not response to inputs. It is always possible to restart the controller and start the procedure from the beginning.

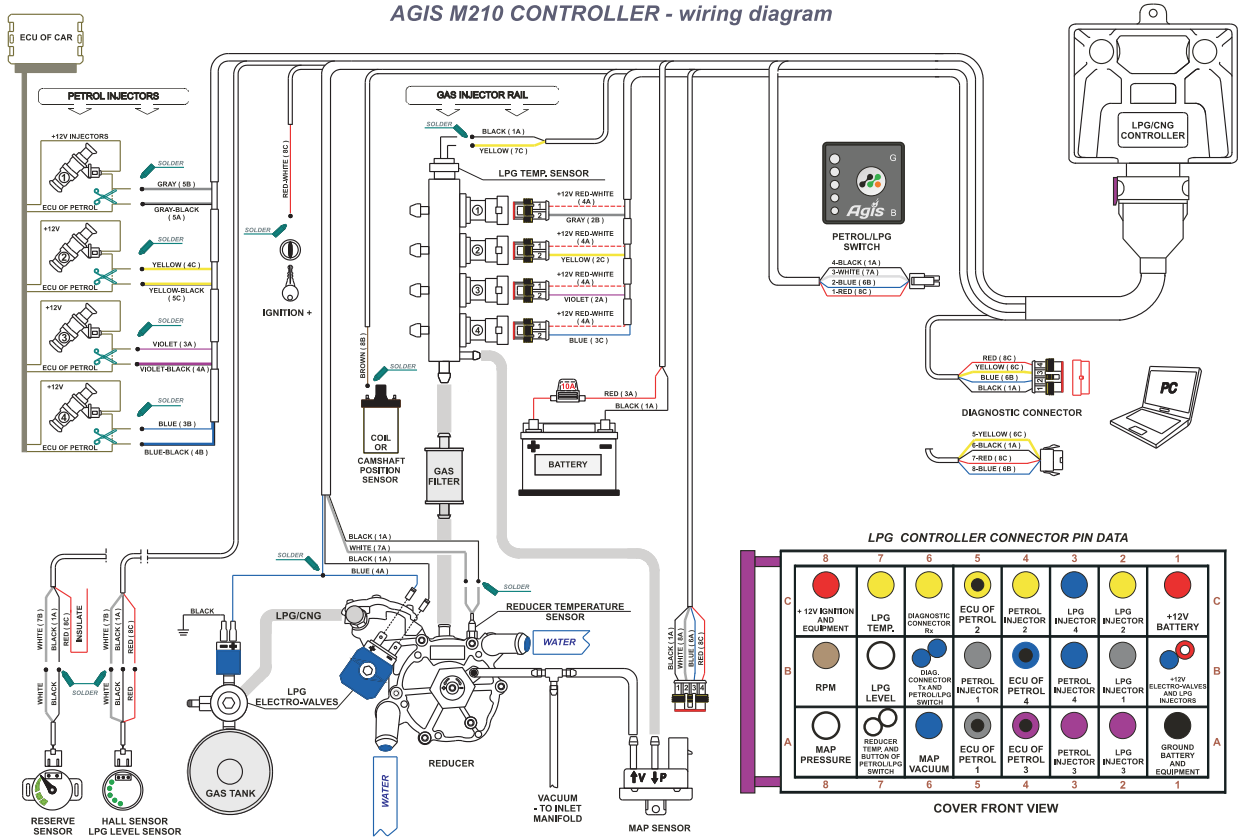
6.2 Controller update

Every updated version of controller software contains folder “FIRMWARE”. When the controller is connected to the engine and engine is running, it is always possible to update software of the controller. Update procedure takes several seconds. During the attempt of software update, a system message is displayed, asking if the software is to be upgraded or downgraded. Automatic notification about newest software version will soon be available after signing up on the website www.appstudio.pl

The function is available in the **Info** menu (**Device update...**).

7. Harness diagram

AGIS M210 CONTROLLER - wiring diagram

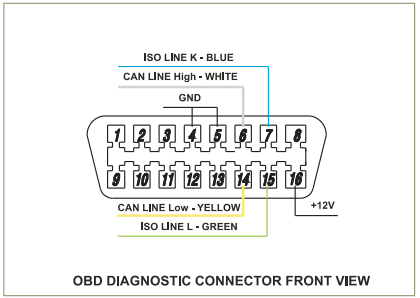


LPG CONTROLLER CONNECTOR PIN DATA

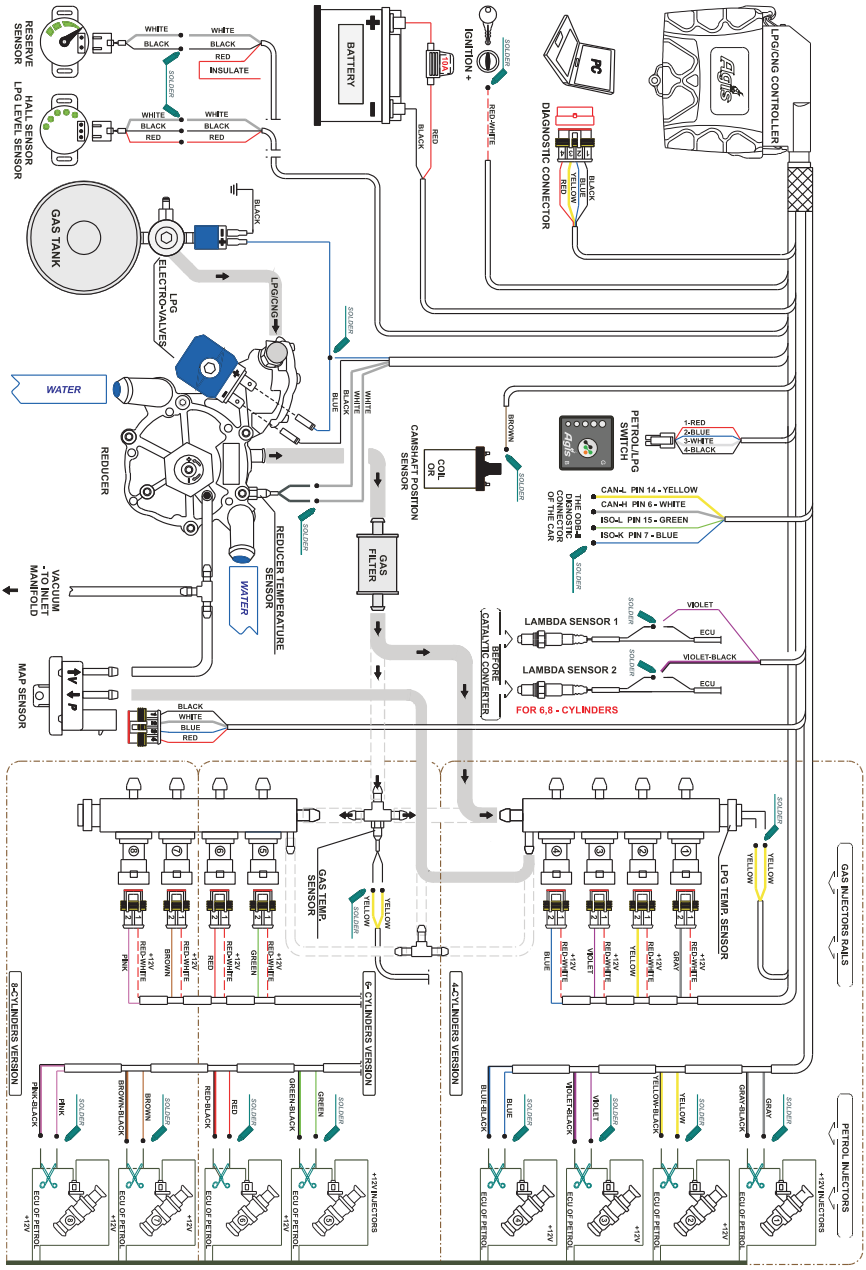
COVER FRONT VIEW

AGIS OBD/ISO CONTROLLER - pin data.

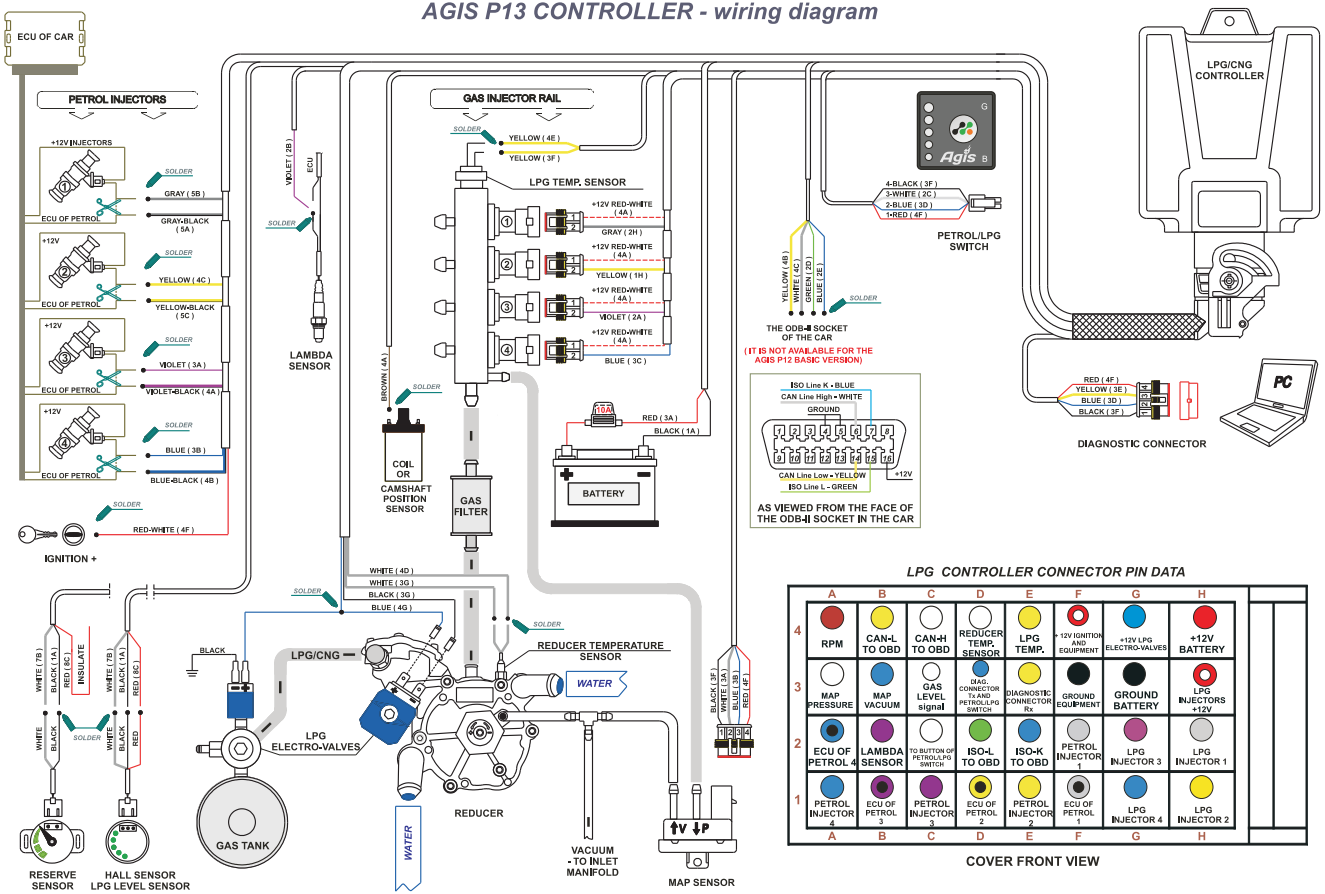
+12V BATTERY	RED	26	1	BLUE	+12V LPG ELECTRO-VALVES
+12V LPG INJECTORS	RED/WHITE	29	2	BLACK	GND - MAP SENSOR
GROUND BATTERY	BLACK	30	3	BLACK	GND - LPG LEVEL SENSOR
GND - LPG ELECTRO-VALVES	BLACK			BLACK	GND - DIAGNOSTIC CONNECTOR
GND - REDUCER TEMP. SENSOR	WHITE	31		BLACK	GND - PETROL/LPG SWITCH
GND - LPG TEMP. SENSOR	YELLOW		4	BROWN	LPG INJECTOR CYL. 7
LPG INJECTOR CYL. 8	PINK	32			
LPG INJECTOR CYL. 6	RED	33	5	GREEN	LPG INJECTOR CYL. 5
LPG INJECTOR CYL. 3	VIOLET	34	6	BLUE	LPG INJECTOR CYL. 4
LPG INJECTOR CYL. 1	GRAY	35	7	YELLOW	LPG INJECTOR CYL. 3
ECU OF PETROL CYL. 1	GRAY/BLACK	36	8	GRAY	PETROL INJECTOR CYL. 1
PETROL INJECTOR CYL. 2	YELLOW	37	9	YELLOW/BLACK	ECU OF PETROL CYL. 2
PETROL INJECTOR CYL. 3	VIOLET	38	10	VIOLET/BLACK	ECU OF PETROL CYL. 3
PETROL INJECTOR CYL. 4	BLUE	39	11	BLUE/BLACK	ECU OF PETROL CYL. 4
PETROL INJECTOR CYL. 5	GREEN	40	12	GREEN/BLACK	ECU OF PETROL CYL. 5
PETROL INJECTOR CYL. 6	RED	41	13	RED/BLACK	ECU OF PETROL CYL. 6
PETROL INJECTOR CYL. 7	BROWN	42	14	BROWN/BLACK	ECU OF PETROL CYL. 7
PETROL INJECTOR CYL. 8	PINK	43	15	PINK/BLACK	ECU OF PETROL CYL. 8
DIAGNOSTIC CONNECTOR - Rx	YELLOW			BLUE	PETROL/LPG SWITCH Tx
		44	16	BLUE	DIAGNOSTIC CONNECTOR - Tx
		45	17	WHITE	PETROL/LPG SWITCH - BUTTON
		46	18		
		47	19		
LPG LEVEL SENSOR	BIAŁY	48	20	BLUE	MAP SENSOR - VACUUM
LPG TEMP. SENSOR	ŻÓŁTY	49	21	WHITE	REDUCER TEMP. SENSOR
MAP SENSOR - PRESSURE	BIAŁY	50	22	BROWN	RPM
ISO9141 LINE L TO OBD	ZIELONY	51	23	VIOLET	LAMBDA SENSOR 1
ISO9141 LINE K TO OBD	NIEBIESKI	52	24	VIOLET/BLACK	LAMBDA SENSOR 2
CAN BUS LINE High	BIAŁY	53	25	YELLOW	CAN BUS LINE Low
+12V PRESSURE SENSOR	CZERWONY	54	26	RED	+12V PETROL/LPG SWITCH
+12V DIAGNOSTIC CONNECTOR, LPG LEVEL SENSOR	CZERWONY	55	27	RED/WHITE	+12V IGNITION



OBD DIAGNOSTIC CONNECTOR FRONT VIEW


AGIS OBD/ISO CONTROLLER - wiring diagram.
LPG/CNG CONTROLLER
DIAGNOSTIC CONNECTOR
IGNITION +
BATTERY
RESERVE SENSOR
HALL SENSOR LPG LEVEL SENSOR
GAS TANK
LPG ELECTRO-VALVES
LPG/CNG
WATER
REDUCER
REDUCER TEMPERATURE SENSOR
VACUUM - TO INLET MANIFOLD
MAP SENSOR
CAMSHAFT POSITION SENSOR
GAS FILTER
PETROL/LPG SWITCH
THE OBD-II DIAGNOSTIC CONNECTOR OF THE CAR
CAN-L PIN 14 - YELLOW
CAN-H PIN 6 - WHITE
ISO-L PIN 15 - GREEN
ISO-K PIN 7 - BLUE
LAMBDA SENSOR 1
LAMBDA SENSOR 2
BEFORE CATALYTIC CONVERTER
FOR 6,8 - CYLINDERS
GAS TEMP. SENSOR
LPG TEMP. SENSOR
GAS INJECTORS RAILS
PETROL INJECTORS
+12V INJECTORS
4-CYLINDERS VERSION
6- CYLINDERS VERSION
8-CYLINDERS VERSION
ECU OF PETROL
ECU OF PETROL +12V
SOLDER

AGIS P13 CONTROLLER - wiring diagram



LPG CONTROLLER CONNECTOR PIN DATA

COVER FRONT VIEW

8. Notes

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Notes