



OMVL spa

Driving towards the future

Injection System **DREAM XXI N**

Software Manual

Version 6.0.3 IC - ENG

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1 Installation

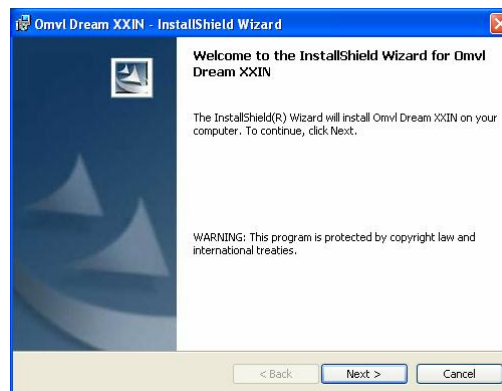
The software comes in CD-ROM (p/n 410530) or from OMVL web site (www.omvlgas.it).

1.1 Minimum system requirements

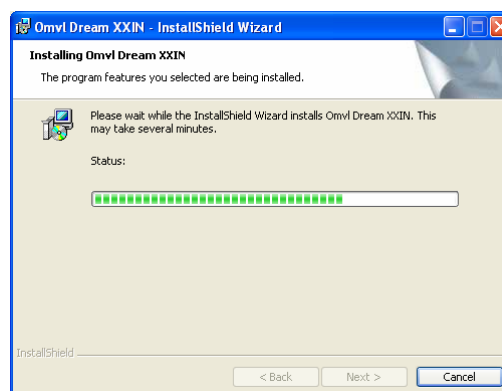
Operating system: Windows XP, Vista, Seven or later
Memory (RAM): At least 16 Mbyte
Hard drive space: At least 20 Mbyte of free space
Display resolution: 800 x 600 or higher
Internet Explorer 5.5 or higher

1.2 Installation Wizard

Put the CD-ROM into the drive of your PC and wait that the Wizard opens. Alternatively, open the zip package and double click the “setup.exe” file.



- When the Wizard opens, click the NEXT button;
- Type in your user name and Organization;
- By default the software installs into C:\Program files\OMVL folder. Click NEXT.
- Finally the Wizard is ready: click the INSTALL. A progress bar will appear:



Once the Wizard ends, click FINISH and you'll have the program icon on your desktop:



1.3 Connection

To connect to an ECU, use one of the available interfaces:

- OMVL 410748 serial interface
- OMVL 410754 USB interface
- OMVL 410777 wireless interface

Note: the ECU communicates only when properly wired to battery and ground (red/black and black wires). To wake-up the ECU, ignition voltage shall be provided to red/white wire.

1.3.1 USB interface

Connect one end of the interface to a free USB port of your PC: the first time, a New Hardware Wizard will start. **The drivers for USB interface are inside the CD-ROM**, or in the zip package.

Locate the serial interface socket of the gas wiring harness (Superseal 4-ways connector); remove the plastic protection cap from the connector and connect the end of the interface. The software will automatically start the communication.

1.3.2 Wireless interface

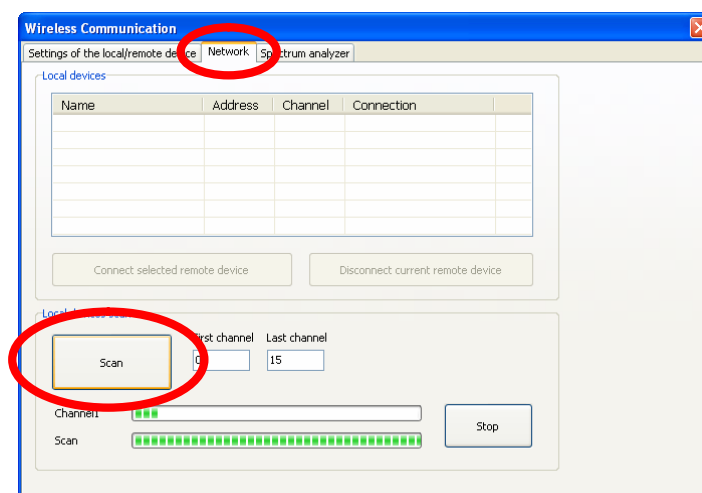
You need to bind the USB receiver to its wireless transmitter, the first time you use them.

- Connect the USB receiver to your PC: drivers are installed automatically during software installation.
- Connect the wireless transmitter to the serial interface socket of gas wiring harness.

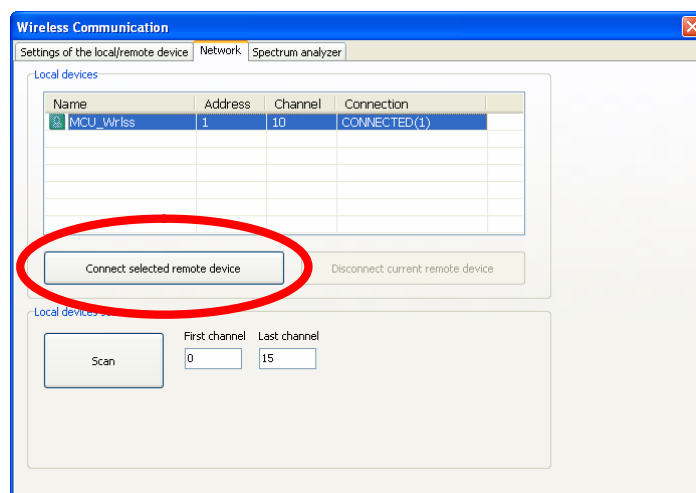
Start the software and click the wireless button, on the left-bottom corner of the main window:



The Wireless communication manager opens: select the **Network** tab, then click the **Scan** button, on the bottom of the window. It will start scanning radio frequencies, in search for the transmitter:

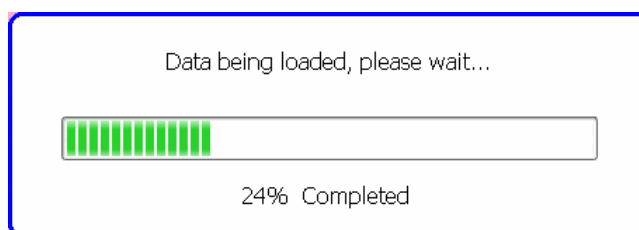


When finished, the connection manager will warn you that it found one remote device. Click OK, then select the device form the list and click the **Connect** button.



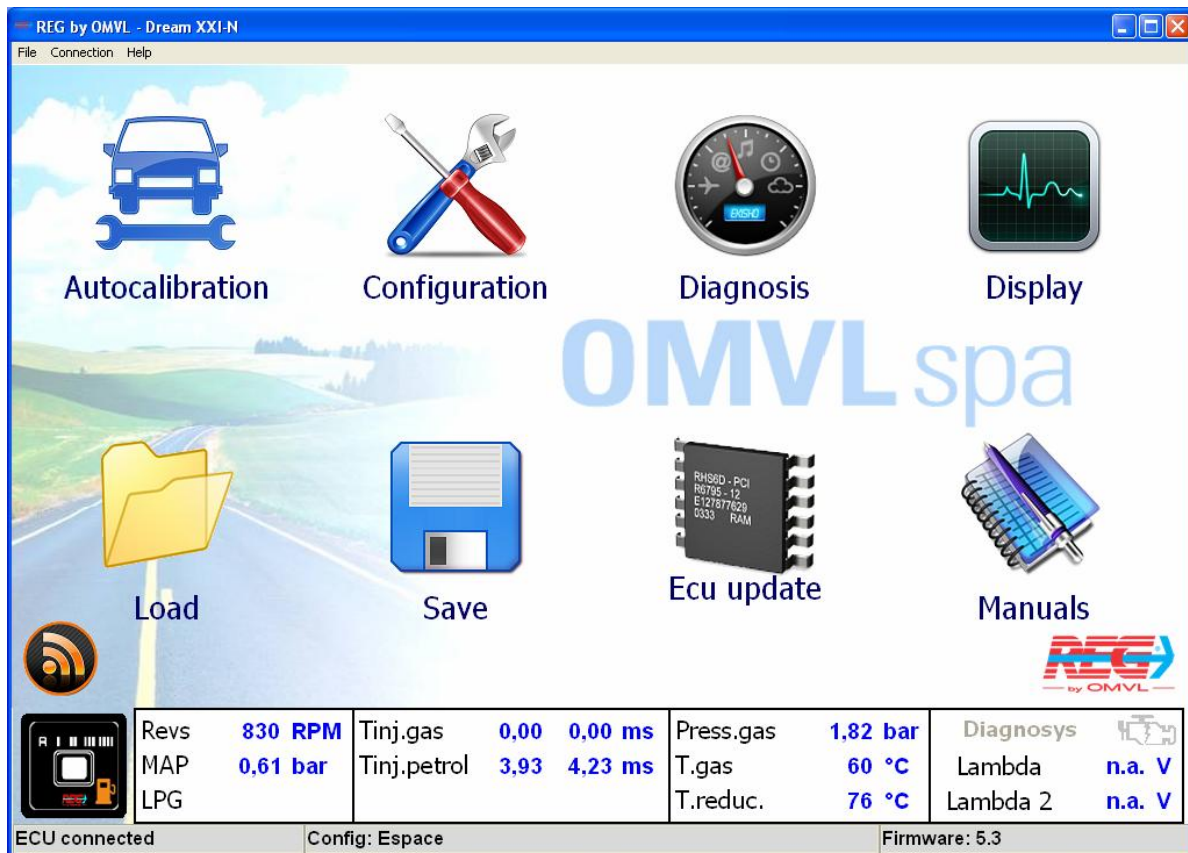
The transmitter is now bound to the receiver and you can close the connection manager; you don't need to repeat this operation anymore.

The software will automatically start the communication. A progress bar will quickly appear:



2 Main window

After the opening splash screen with REG by OMVL logo, the main window will show:



Auto-calibration: starts the auto-calibration procedure



Configuration: shows the parameters currently in memory



Diagnosis: helps you diagnose problems and failures



Display: shows a graphical display of real-time readings, with data-logging facility



Load: opens a configuration from your hard-drive



Save: saves current configuration to your hard-drive





ECU update: upgrades the connected ECU to latest firmware version



Manuals: lets you open a manual, from the available ones

2.1 Status panel

At the bottom of the window, the Status panel shows main readings in real-time:

| | | | | | | | | |
|---|------|----------|-------------|--------------|-----------|----------|-----------|---|
|  | Revs | 836 RPM | Tinj.gas | 0,00 0,00 ms | Press.gas | 1,87 bar | Diagnosys |  |
| | MAP | 0,60 bar | Tinj.petrol | 3,73 4,07 ms | T.gas | 64 °C | Lambda | n.a. V |
| | LPG | | Adaptivity | 6 % | T.reduc. | 88 °C | Lambda 2 | n.a. V |

Change over switch: it's a software replica of the real switch installed inside the car.

- Fuel: the orange “pump” icon on the right shows petrol. The yellow “G” icon on the left instead shows gas; it blinks, while the ECU is waiting to switch to gas.
- Level gauge: the 5 dots on the top (4 green + 1 red) show the level of gas in the tank.
- Button: click the button to switch from petrol to gas. Click it again to get back to petrol.

| | |
|----------------|--|
| Revs | Engine's speed in RPM |
| MAP | Manifold Absolute Pressure, in bar |
| LPG/CNG | Shows if current configuration is LPG of CNG |

| | |
|--------------------|--|
| Tinj.gas | Gas injection time (pulse width duration) in ms. Left reading is for the first bank, right one for second bank (if available) |
| Tinj.petrol | Petrol injection time, in ms. Left reading is for the first bank, right one for second bank (if available) |
| Adaptivity | Correction % applied by the Adaptivity feature (if enabled) |

| | |
|------------------|--|
| Press.gas | Pressure of gas inside the rail, in bar. OMVL LPG systems have nominal pressures of 0.9, 1.2 or 1.7bar (three models). CNG reducers have a nominal pressure of 2.0bar. |
| T.gas | Temperature of gas, inside the rail, in °C |
| T.reduc. | Temperature of water, inside the pressure reducer, in °C |

| | |
|------------------|---|
| Diagnosis | This icon blinks in red when the ECU detects a diagnostic fault. The Diagnosis page shows details about the failure. |
| Lambda | Voltage of the first lambda oxygen sensor (optional connection) |
| Lambda2 | Voltage of the second lambda oxygen sensor (optional connection) |

2.1.1 Status bar

The bottom of the screen shows three fields:

| | |
|-------------------|---|
| Connection | ECU not connected or ECU connected |
| Config | Name of the current configuration in memory |
| Firmware | Version currently programmed in the connected ECU |

2.2 Menu

File:

- **Open:** loads a configuration from your hard-drive, just like the Load button
- **Save:** saves the current configuration into a file, just like the Save button
- **Exit:** closes the software

Connection:

- **Start polling:** this command normally is disabled. Use it to start polling again, after you have stopped it.
- **Stop polling:** by default, the software polls all available communication ports, in search for an ECU. Once an ECU is found, the communication starts automatically.
You shouldn't stop this procedure.
- **Connect:** if you stopped the polling procedure, this command lets you manually connect to an ECU. If the ECU is not properly connected, an error message will appear.
- **Disconnect:** once connected, you can manually disconnect the current ECU.
Normally you don't need to use this command.

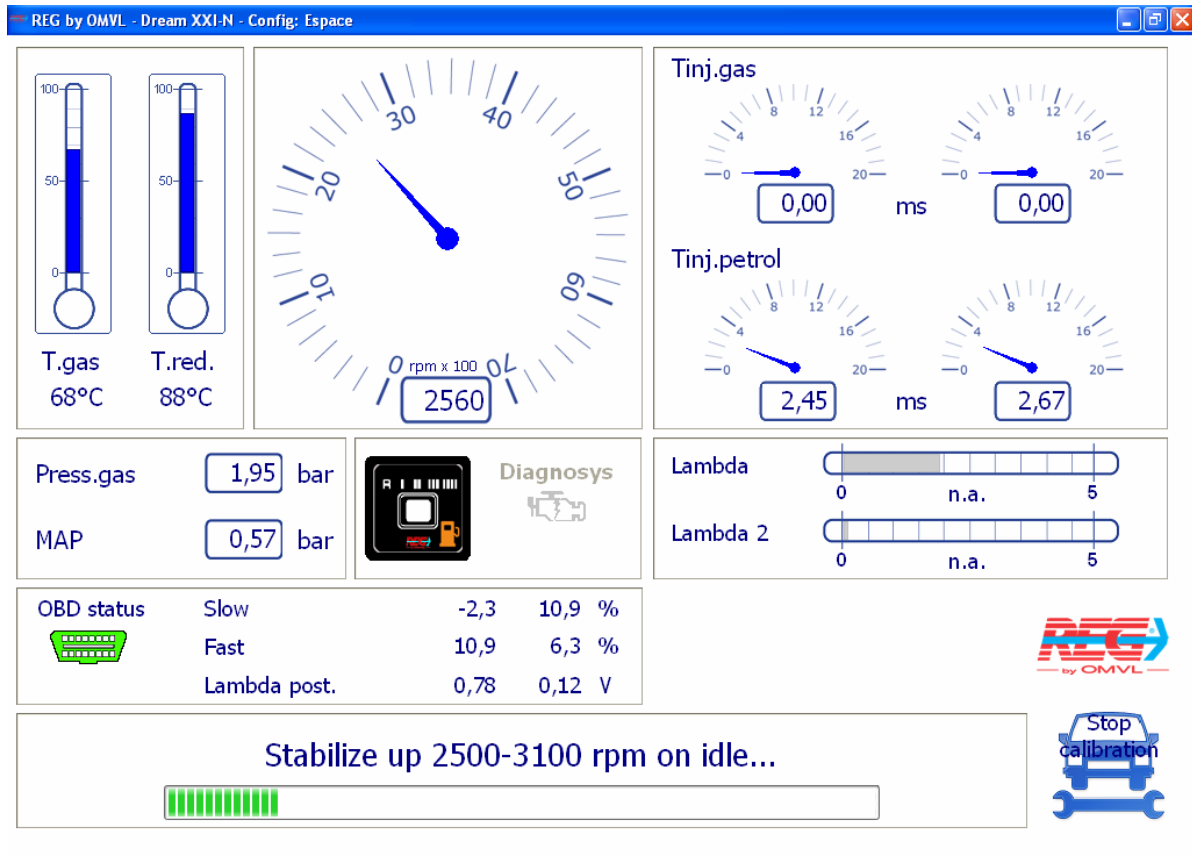
Help:

- **Language:** the software can be translated into the chosen language
- **Zoom:**
 - **Default:** reset the window to its default size
 - **Zoom in:** makes the window bigger. Use it to fit the widow to your screen.
Icons and text will be re-sized the next time you open the software.
 - **Zoom out:** makes the window smaller. Use it to fit the widow to your screen.
Icons and text will be re-sized the next time you open the software.
- **Help:** opens an About box showing the current software version

3 Auto-calibration

The Auto-calibration is a procedure that automatically creates a map for gas carburetion, allowing you to run the car on gas at the first time.

The Auto-calibration page shows the same gauges of the Display page. On the bottom of the screen, the **Start calibration** button starts the procedure:



3.1.1 Preparation

- Engine should be in good shape: ignition, petrol injection, throttle body, oxygen sensors
- Check the RPM reading on the software
- Set the basic parameters in Configuration page: LPG/CNG, cylinders...
- Park the car in a safe place
- Warm-up the engine and let it idle in neutral gear
- **All loads should be OFF:** air-con, lights, defroster, etc

3.1.2 Running the procedure

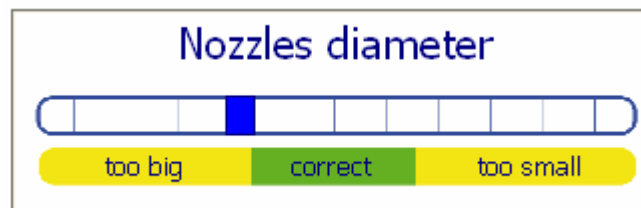
1. The procedure will start on petrol and wait until the water temperature reaches **60°C**
2. When required so, **rev-up to 2500-3100 RPM**, in neutral gear
3. Then, you shall not move the accelerator pedal anymore. **Keep a constant throttle**, even if the engine revs-down.

4. The software runs for some seconds on petrol and acquires the original petrol injection times
5. Then it switches to gas and repeatedly adjusts the gas map
6. The adjustments become slower and slower, until the procedure finishes.

A progress bar on the bottom of the screen will show you the completion percentage; overall, the auto-calibration should require 2 to 5 minutes.

3.1.3 Nozzles diameter

Once the auto-calibration is finished, this gauge on the bottom of the screen will suggest if the flow rate of gas injectors is correct for the engine:



- **Too big:** if the blue spot is closer to the left side of the gauge, it means that the flow rate of your gas injectors is too big. You should reduce the flow rate, installing smaller nozzles.
- **Correct:** when the blue spot is at the center of the gauge, the flow rate of your gas injectors is right for the engine.
- **Too small:** in this case, the flow rate of your gas injectors is too small, and you should increase it, installing bigger nozzles.

3.2 Trouble-shooting

3.2.1 Failures

All sensors of the gas system are checked before and during the auto-calibration, so any failure or misconnection will be promptly reported.

Injectors and solenoids, instead, are checked only when the procedure switches to gas. Any failure or misconnection will be reported and the auto-calibration will be aborted.

You can also abort the calibration at any time, clicking the **Stop calibration** button next to the progress bar. Once back to the main window, you can open the **Diagnosis** page and check the problem.

3.2.2 Calibration doesn't finish

If the calibration takes too long and seems to go over and over, chances are that the flow rate of injection rail is not right for your engine. In this case, you should manually stop the auto-calibration and **change the nozzles** of your injection rail.

4 Configuration

This window is folded in 6 pages. Browse each page clicking its button, on top of the window:

REG by OMVL - Dream XXI-N - Config: Standard0mvl#0

File Modify

Parameter Sensors Map Lambda Driveability Gas/petrol

Fuel type LPG

Injectors REG Fast

Change-over type In acceleration

Revs.change-over 1600 RPM

Temperature 30 °C

Delay 40 s

☐ Start on gas with hot engine

☐ Tank solenoid valve with dedicated wire

☐ Valvetronic / Start & Stop

☐ MultiAir

If RPM reading is wrong, connect the brown wire and set these parameters

Cylinders 4 cylinders

Injection Sequential

Revs signal Standard

Ignition Two coils

Reducer STD

☐ Gas solenoids opened in advance

Note

ECU not connected

Config: Standard0mvl#0

Firmware: 0.0

| | | | | | | | |
|------|----------|-------------|------|---------|-----------|----------|-----------|
| Revs | 0 RPM | Tinj.gas | 0,00 | 0,00 ms | Press.gas | n.a. bar | Diagnosis |
| MAP | n.a. bar | Tinj.petrol | 0,00 | 0,00 ms | T.gas | n.a. °C | Lambda |
| LPG | | | | | T.reduc. | n.a. °C | Lambda 2 |
| | | | | | | | n.a. V |
| | | | | | | | n.a. V |

Note: this version does not require any USB dongle-key All features are available by default.

4.1 Menu

File:

- **Open:** loads a configuration from your hard-drive.
- **Save:** saves the current configuration into a file.
- **Exit:** closes the Configuration window.

Modify:

- **Copy:** copies the selected portion of the map into the clipboard.
- **Paste:** pastes the clipboard into the select portion of the map.
- **Reset ECU:** reset all parameters of the ECU to default values.

4.2 Parameters

| | | |
|-----------|----------|---|
| Fuel type | LPG | ▼ |
| Injectors | REG Fast | ▼ |

Fuel type: select LPG or Methane (CNG). This selection resets all parameters of the configuration to default values.

Injectors: REG Fast are the standard injectors for OMVL systems. REG Standard instead is for backward compatibility with obsolete injectors. A wrong setting would cause erratic gas injection. This selection resets all parameters of the configuration to default values.

4.2.1 Change-over

| | | |
|---|-----------------|-----|
| Change-over type | In acceleration | ▼ |
| Revs.change-over | 1600 | RPM |
| Temperature | 30 | °C |
| Delay | 40 | s |
| <input type="checkbox"/> Start on gas with hot engine | | |

The engine normally cranks on petrol, then the Dream XXI-N ECU switches automatically to gas, as soon as these conditions are met:

- 1) The change-over procedure starts as soon as the ECU gets ignition voltage and engine revs.
 - 2) The ECU initially waits the programmed **Delay** time, to allow initialization of lambda oxygen sensors. Accepted values range from 20 to 250s.
 - 3) Then the ECU waits that the engine warms up, reaching the programmed water **Temperature**. Accepted values range from 20 to 90°C.
 - 4) Finally the ECU switches to gas, as soon as the engine speed reaches the programmed **Revs**. Accepted values range from 400 to 3000 RPM.
- Change-over type** could be in acceleration, or deceleration.

After the automatic change-over, the system normally stays on gas, until the engine is switched off.

Start on gas with hot engine: this check-box over-rides the change-over procedure and immediately starts on gas.

This works only for hot cranking, that is when the water is warmer than the programmed temperature; if the water is cooler, the system will perform the usual change-over procedure.

4.2.2 RPM reading

Default settings of the ECU let it read the engine speed from the period of petrol injection, so usually there's no need to connect the brown wire (see wiring diagram).

Anyway, in the unlikely event that you experience inconsistent RPM reading, you should connect the brown wire to:

- Ignition coil: connect to the low voltage, negative post of a coil, with 0-12V signal.
WARNING: never connect the brown wire to high-voltage ! You could blow the ECU
- Power transistor: connect to wire coming from Engine Control Module, with 0-5V signal.
- Engine speed sensor: connect to any wire going to Engine Control Module, or instrumentation dashboard, with 0-5V signal.

| | | |
|-------------|-------------|---|
| Cylinders | 4 cylinders | ▼ |
| Injection | Sequential | ▼ |
| Revs signal | Standard | ▼ |
| Ignition | Two coils | ▼ |

Cylinders: set the correct number of cylinders. Accepted values are 3, 4, 5, 6, 8 and 10. A wrong setting would cause incorrect RPM reading.

Injection: select whether the petrol injection is Sequential or Full-group. A wrong setting would cause erratic gas injection.

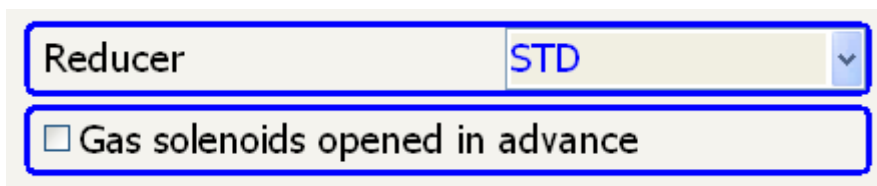
Revs signal: select the type of signal feeding the brown wire. A wrong setting would cause erratic RPM reading, or no reading at all.

- **Standard:** select this if the signal is 0-12V (like ignition coil)
- **Weak:** select if the signal is 0-5V (like speed sensor)

Ignition: select the source feeding the brown wire. A wrong setting would cause erratic RPM reading, or no reading at all.

- **One coil:** select if the brown wire is connected to a coil of a direct coil ignition system (one coil per each cylinder)
- **Two coils:** select if the wire is connected to a coil of a wasted-spark ignition system (one coil per two cylinders, or more)
- **RPM sensor:** select if the wire is connected to either to an engine speed sensor, or to the coil of an old mechanical ignition distribution system.
- **RPM sensor 2:** select this if the wire is connected to a speed sensor, and the previous setting doesn't work.

4.2.3 Further settings



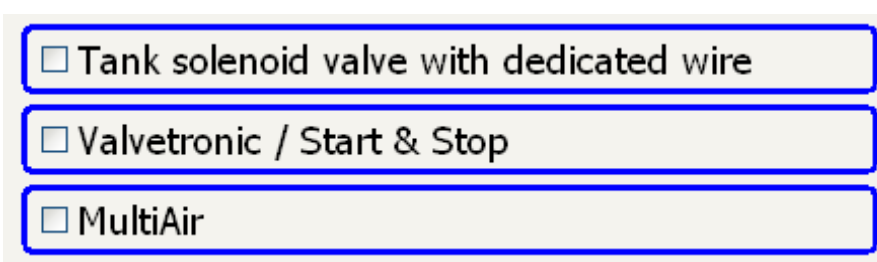
The screenshot shows a software interface with two settings. The first is a dropdown menu labeled 'Reducer' with 'STD' selected. The second is a checkbox labeled 'Gas solenoids opened in advance' which is checked.

Reducer: in case of LPG, select the pressure reducer installed (Standard, MP, or HP).

Gas solenoids opened in advance: before switching to gas, the ECU pressurizes the gas system by powering the solenoids 1 second before driving gas injectors.

If you experience hesitation when switching to gas, and your application has longer pipes, select this check-box to have 5 seconds of gas pressurization.

Note: this setting impacts on time advancer optionally connected to blue wire of gas ECU.



The screenshot shows three checkboxes in a list, all of which are unchecked. The labels are 'Tank solenoid valve with dedicated wire', 'Valvetronic / Start & Stop', and 'MultiAir'.

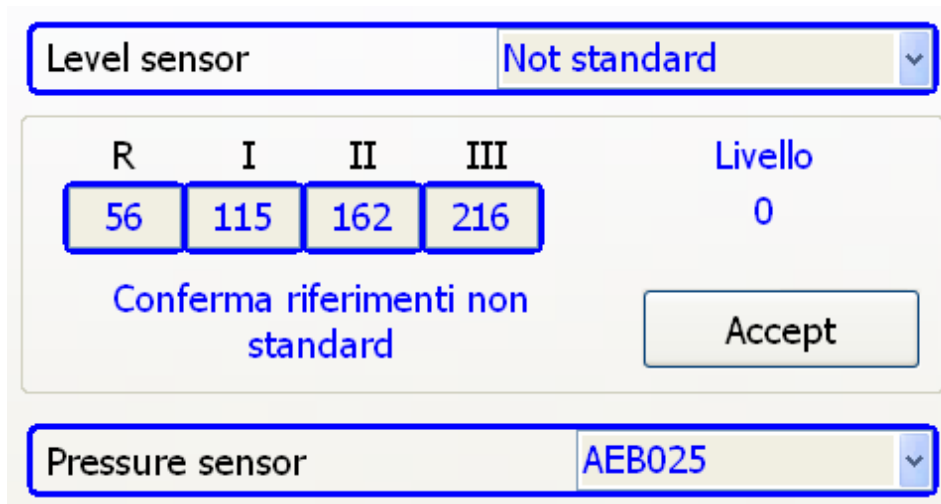
Tank solenoid valve with dedicated wire: select this check-box, if you connected a solenoid to the blue/white wire of the wiring harness. It enables the diagnosis of this solenoid.

Valvetronic / Start & Stop: select this check-box if the engine is of BMW Valvetronic family, or has the Start & Stop feature, that shuts down the engine at junctions.

MultiAir: select this box if the engine is of Fiat MultiAir family.

4.3 Sensors

This page lets you set the level sensor, that drives the gas level gauge display of the change-over switch, installed inside the passenger compartment.



Level sensor Not standard

| R | I | II | III |
|----|-----|-----|-----|
| 56 | 115 | 162 | 216 |

Livello 0

Conferma riferimenti non standard

Accept

Pressure sensor AEB025

Level sensor: select the gas level sensor installed in your system.

- **1050:** this is the standard sensor installed in LPG multi-valves, with a resistance ranging from 30K to 100Ω.
- **1090:** optional sensor for LPG multi-valve, with a resistance ranging from 0 to 90Ω.
- **806/807:** standard manometer for OMVL Dream XXI-M CNG pressure regulator.
- **Sensata 260bar:** this is the high-pressure sensor integrated into OMVL CPR and RP-09 families of CNG pressure reducers.
- **Non standard:** this setting is for any other sensor not listed above, with output voltage increasing with increasing level of gas in the tank.
You have to manually set the thresholds of the level gauge display.
- **Non standard, inverted:** this setting is for any other sensor not listed above, with an output voltage decreasing with increasing level of gas in the tank.
You have to manually set the thresholds of the level gauge display.

Pressure sensor: select the type of pressure sensor installed in your system.

- **AEB025:** this is the standard sensor for OMVL systems.
- **AEB013:** setting for backward compatibility with this obsolete differential pressure sensor.

4.4 Map

This page shows the map created by the Auto-calibration procedure and lets you manually adjust it.

| t inj/rpm | 500 | 1000 | 1500 | 2000 | 2500 | 3000 | 3500 | 4000 | 4500 | 5000 | 5500 | 6000 |
|-----------|-----|------|------|------|------|------|------|------|------|------|------|------|
| 2,00 | 142 | 142 | 143 | 145 | 144 | 143 | 145 | 148 | 149 | 150 | 150 | 150 |
| 2,50 | 148 | 148 | 149 | 151 | 150 | 149 | 152 | 155 | 156 | 157 | 157 | 157 |
| 3,00 | 165 | 165 | 166 | 167 | 166 | 166 | 170 | 174 | 175 | 176 | 176 | 176 |
| 3,50 | 168 | 168 | 169 | 170 | 169 | 169 | 172 | 175 | 176 | 177 | 177 | 177 |
| 4,50 | 160 | 160 | 162 | 164 | 164 | 164 | 165 | 167 | 168 | 169 | 169 | 169 |
| 6,00 | 160 | 160 | 161 | 162 | 162 | 163 | 165 | 167 | 168 | 170 | 170 | 170 |
| 8,00 | 151 | 151 | 154 | 157 | 157 | 158 | 160 | 163 | 164 | 165 | 165 | 165 |
| 10,00 | 143 | 143 | 143 | 144 | 145 | 146 | 147 | 149 | 150 | 151 | 151 | 151 |
| 12,00 | 128 | 128 | 129 | 130 | 130 | 131 | 135 | 139 | 140 | 142 | 142 | 142 |
| 14,00 | 126 | 126 | 127 | 129 | 129 | 129 | 132 | 136 | 137 | 139 | 139 | 139 |
| 16,00 | 126 | 126 | 127 | 129 | 129 | 129 | 132 | 136 | 137 | 139 | 139 | 139 |
| 18,00 | 125 | 125 | 126 | 127 | 128 | 129 | 130 | 132 | 134 | 136 | 136 | 136 |

- **Columns:** each one refers to a different engine speed, ranging from 200 to 8000RPM.
Note: this software version supports either 12 columns, or 6 columns of older ECUs.
- **Rows:** each one refers to a different engine load, represented by petrol injection times ranging from 0 to 30ms.
- **Cells:** the values inside are a representation of the *K* ratios between gas injection times and petrol ones - the higher the value, the longer the gas injection. Accepted values: 0 to 255.
Note: the color of the cell comes from its value - the higher, the brighter.
- **Red ball:** shows the current working point, on the map.

Number of banks
1

| | | | |
|-----------|------|------|---|
| Bank 1 | Fast | Slow | |
| Fuel trim | 5,5 | 3,9 | % |

Number of banks: set the number of banks of the engine. If it has only one pre-cat oxygen lambda probe, like 4 cylinders in-line, set 1 bank. If instead it has two, like a 4 cylinder boxer, V6 or a V8, set two banks.


Fuel trim bank 2: the gas map is applied to both banks. This parameter lets you adjust the second bank (injectors E F G H) by -20 to +20.

Petrol fuel trims: with the OBD connection, the software shows the Fast and Slow fuel trims of the petrol ECU, Bank 1 and Bank 2 (if available).

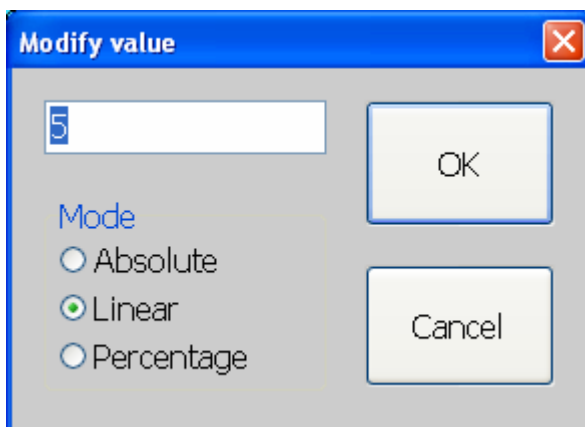
4.4.1 Modify the map

In a Slave system, having the right gas carburetion means not interfering with engine control management. You reach this only when putting in the map the right values, that keep the petrol injection times and fuel trims at the same values they have on petrol.

1. **Select:** click the LEFT mouse button over a cell and drag it over the interested portion. Alternatively, you can use the cursor keys of the keyboard, and extend the selection holding down the Shift key.
2. **Switch to petrol:** click the software switch on the bottom of the screen. Alternatively, you can tap the SPACE BAR.
3. **Original values:** keep a constant speed and load, and take note of petrol injection times on the Status panel. You should also watch at the petrol fuel trims, below the map.

| | | | | | | | |
|------|----------|-------------|--------------|-----------|----------|-----------|---|
| Revs | 849 RPM | Tinj.gas | 0,00 0,00 ms | Press.gas | 1,85 bar | Diagnosys |  |
| MAP | 0,60 bar | Tinj.petrol | 3,79 4,14 ms | T.gas | 63 °C | Lambda | n.a. V |
| LPG | | Adaptivity | 6 % | T.reduc. | 86 °C | Lambda 2 | n.a. V |

4. **Switch to gas:** click the software switch or tap the SPACE BAR.
5. **Altered values:** on gas, the petrol injection times and fuel trims will change. If for example they are increasing, it means that the gas carburetion is lean, thus you should enrich the map.
6. **Modify:** tap the ENTER key to open the Modify value dialog. It lets you type a number:



The image shows a 'Modify value' dialog box with a blue title bar and a close button (X). Inside, there is a text input field containing the number '5'. Below the input field, there are three radio buttons under the heading 'Mode': 'Absolute', 'Linear' (which is selected), and 'Percentage'. To the right of the mode options are two buttons: 'OK' and 'Cancel'.

Absolute: this puts the number you typed into all selected cells. Usually you don't need to do this.

Linear: use this to adjust the map. If you need to enrich, type a positive number. If instead you need to lean, type a negative number. The number typed will be added to the selected cells.

Percentage: adds the number you typed as a percentage to the selected cells. Usually you don't need to do this.

Once the map is modified, the engine control management will react to the changed gas carburetion, moving the petrol fuel trims and injection time. If the typed the right modification, the petrol fuel trims and injection time should move closer to original values, that you have noted while on petrol.

Suggestion: proceed just with small modifications, up to ± 10 . After each change, evaluate the reaction of engine control unit, and repeat the modification as necessary.

4.5 Lambda

The Dream XXI-N ECU can optionally be connected to two lambda oxygen sensors. This page lets you set some parameters about these sensors:

| | |
|---------------------------|---------------|
| Pre-catalytic sensor type | 0 - 1 Volt |
| Lambda 1 | Not connected |
| Lambda 2 | Not connected |

Pre-catalytic sensor type: if you wired up a pre-cat lambda probe to the Dream XXI-N ECU (see wiring diagram), you should select the correct type of probe.

- **0-1 Volt:** most common type of Heated Exhaust Gas Oxygen sensor, with output voltage switching between 0 and 1V.
- **0-5 Volt:** HEGO sensor, with voltage switching between 0 (lean) and 5V (rich).
- **5-0 Volt:** uncommon HEGO sensor, with voltage switching between 0 (rich) and 5V (lean). Found on some British V8 engine.
- **0.8-1.6 Volt:** uncommon HEGO sensor, with voltage switching between 0.8 and 1.6V.
- **UEGO:** common type of Universal Exhaust Gas Oxygen sensor made by Bosch and NTK, found on most of current European engines.
- **2.5-3.5 Volt:** uncommon HEGO sensor, with voltage switching between 2.5 and 3.5V.

Lambda 1: select the location of the oxygen sensor connected to the purple wire (if any).

- **Not connected:** the default setting completely ignores the purple wire. The Lambda reading on the Status panel, at the bottom of the screen, is disabled. Emulation on the grey wire is disabled, too.
- **Pre:** the oxygen sensor is located before the catalytic converter (pre-cat). This setting enables the Lambda reading on the Status panel. Pre-cat lambda emulation on the grey wire is enabled: connect this wire ONLY if instructed so by OMVL Technical Support service.
- **Post:** the oxygen sensor is located after the catalytic converter (post-cat). This setting enables the Lambda reading on the Status panel. Post-cat lambda emulation on the grey wire is enabled: connect this wire ONLY if instructed so by OMVL Technical Support service.

Lambda 2: select the location of the oxygen sensor connected to the purple/black wire (if any). This settings control the emulation on the grey/black wire.

4.6 Driveability

This page shows many parameters: OBD connection, Adaptivity, Injection sequence advance, Sequential fuel change-over, Extra-injection filter and Enrichment in acceleration.

| | | | | | | | | |
|------|----------|-------------|------|---------|-----------|----------|-----------|--------|
| Revs | 836 RPM | Tinj.gas | 0,00 | 0,00 ms | Press.gas | 1,87 bar | Diagnosys | |
| MAP | 0,60 bar | Tinj.petrol | 3,73 | 4,07 ms | T.gas | 64 °C | Lambda | n.a. V |
| LPG | | Adaptivity | | 6 % | T.reduc. | 88 °C | Lambda 2 | n.a. V |

4.6.1 OBD connection

The OBD icon shows the current status of OBD connection, once the engine is running and you performed an OBD connection thru green wire (K-line) or yellow/green and yellow/grey (CAN bus):



Strike-thru: the OBD connection is not working or disconnected



Blinking: the ECU is trying to start the OBD connection



Green: the OBD connection is working

OBD connection type: force the OBD connection with a specific diagnostic protocol.

- **Auto:** the default setting automatically scans thru all supported protocols and automatically finds the correct one. On some cars, where different ECUs share the same diagnostic line (engine control unit, ABS unit, etc), this procedure could fail or cause erratic diagnostic trouble codes of the engine management. In this case, manually force the correct protocol.
- **1: ISO9141-2**
- **2: KWP – 2000 Fast Init**
- **3: KWP – 2000 Slow Init**


- **6: CAN standard - 250 kbps**
- **7: CAN extended - 250 kbps**
- **8: CAN standard - 500 kbps**
- **9: CAN extended - 500 kbps**

Type of petrol fuel trims: to let Adaptivity feature, you need to set the correct type of fuel trims of the petrol ECU.

- **Straight:** the fuel trims of petrol ECU are positive, when the carburetion is lean.
- **Inverted:** the fuel trims of petrol ECU are positive, when the carburetion is rich.

4.6.2 Adaptivity

Once the OBD connection is established, the Dream XXI-N ECU can adjust gas injection by its own, monitoring the fuel trims of the petrol ECU and applying a correction factor for gas injection times computed from the map. When this feature is on, you can see the correction % in the Status panel:

| | | | | | | | |
|------|----------|-------------|--------------|-----------|----------|-----------|---|
| Revs | 849 RPM | Tinj.gas | 0,00 0,00 ms | Press.gas | 1,85 bar | Diagnosys |  |
| MAP | 0,60 bar | Tinj.petrol | 3,79 4,14 ms | T.gas | 63 °C | Lambda | n.a. V |
| LPG | | Adaptivity | 6 % | T.reduc. | 86 °C | Lambda 2 | n.a. V |

Note: the Adaptivity % usually changes slowly, but could have different values at different working points.

4.6.3 Injection sequence advance

☐ Anticipate the injection sequence
Incompatible with petrol strategy when running on gas
☒ Sequential fuel changeover

This check-box activates a procedure that automatically acquires the petrol injection sequence, and then advances the gas injection sequence of a fixed phase.

This could help, when experiencing jerking during transients, especially if injector's hoses are very long.

WARNING: do not use this feature unless instructed so by OMVL Technical Support service.

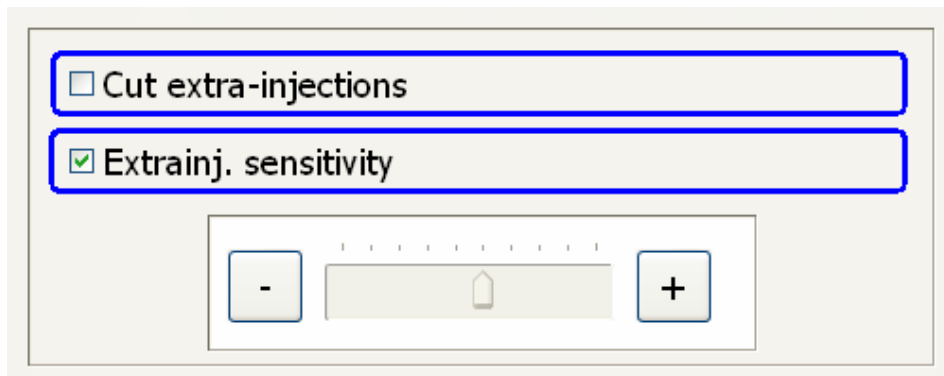
4.6.4 Sequential fuel change-over

By default, the ECU switches to gas one cylinder at a time, allowing a smooth transition. Normally you shouldn't disable this feature, because all cylinders would switch at the same time, allowing a quicker transition, but possibly causing jerking or hesitation.

4.6.5 Extra-injection filters

Some engine management units have extra-injection strategies, that inject very short petrol injections out of the aspiration stroke. These strategies are used to increase the power output or cool down the engine head.

On gas, extra-injections must be filtered because they cause jerking during accelerations, while cruising or even at idle. When that happens, you will see petrol injection times suddenly go to very low values, and the ball on the map jumping to the top.



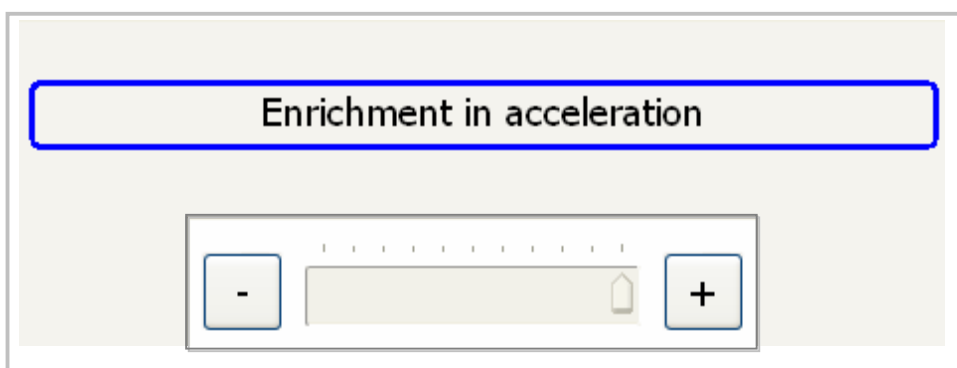
Cut extra-injections: with this check-box selected, any petrol injection shorter than 1.4ms is completely ignored. This could fix jerking problems that the extra-injection sensitivity can't fix.

Extrainj. sensitivity: with this check-box selected, petrol extra-injections will generate a gas injection that you can adjust with the fader. Move the fader till you clear the jerking.

If the check-box is disabled, the fader won't work and petrol extra-injections wouldn't be filtered and the gas injection would be computed from the map, possibly causing jerking.

4.6.6 Enrichment in acceleration

Many engine management units have transient enrichment of petrol injection, during accelerations. Sometimes this causes jerking or hesitation, on gas. You can fix it with this filter:



- By default the filter is defeated, with its fader all the way right; in this position, the petrol transient is copied to the gas injection, applying all the enrichment.
- As you move the fader to the left, the Dream XXI-N ECU will follow the petrol transient slower and slower, thus applying less enrichment to the gas injection.
Whenever the enrichment is filtered, the box of the filter will glow in red, on the screen.

Suggestion: start with the fader all the way right and move it to the left, until you fix the hesitation.

4.7 Gas / Petrol

The last page shows the petrol back-up strategies at idle and at high speeds.

4.7.1 Operation at idle

| Operation at idle | | |
|---------------------------|--|---|
| <input type="radio"/> Gas | <input type="radio"/> Return to petrol | <input checked="" type="radio"/> Petrol |
| RPM for identifying idle | 1100 rpm | |

Gas: by default, the ECU will stay on gas all the time.

Return to petrol: this feature forces the ECU to temporarily switch to petrol during decelerations, while the engine revs below the threshold. It will switch to gas again after few seconds. Use this feature to fix problems of engine stalling, while getting back to idle after a cut-off.

Petrol: this feature will force the ECU to stay on petrol, as long as the engine revs below the threshold. As soon as it revs above it, the ECU will switch to gas. Use this feature only if you need to fix problems of idling, that you can't fix in any other way.

RPM for identifying idling: this is the threshold below which the ECU will switch to petrol.

Note: the change-over switch will does not show any petrol back-up. You can tell that the feature is on because its box glows red, and gas injection times go temporarily to zero, on the Status panel.

4.7.2 Operation at high RPM

| Operation at high RPM | | |
|--------------------------------------|--|------------------------------|
| <input type="radio"/> Gas | <input checked="" type="radio"/> Petrol addition | <input type="radio"/> Petrol |
| RPM for petrol addition | from 4500 rpm to 9000 rpm | |
| Petrol inj. time for petrol addition | 15 ms | |
| Amount of petrol addition | 2 ms | |

Gas: by default, the ECU will stay on gas all the time.

Petrol addition: with this feature selected, the gas ECU drives the petrol injectors as well as the gas ones, injecting some amount of petrol, along with gas. The feature is enabled only while the engine works in the programmed range (speed, load); as soon as the engine goes out of the range, the petrol addition will stop.

Use this feature to add some power at high revs, if you experience power loss on gas.

- **Amount of petrol addition:** sets the petrol injection time applied during the Petrol addition. Gas injection times will be shortened by an equivalent amount (computed from gas map).

Petrol: this feature will force the ECU to stay on petrol, as long as the engine stays in the programmed range. As soon as it goes out of the range, the ECU will switch to gas. Use this feature only if you need to fix problems at high revs, that you can't fix in any other way. It's useful also to protect sensitive catalytic converters from over-heating, caused usually by CNG.

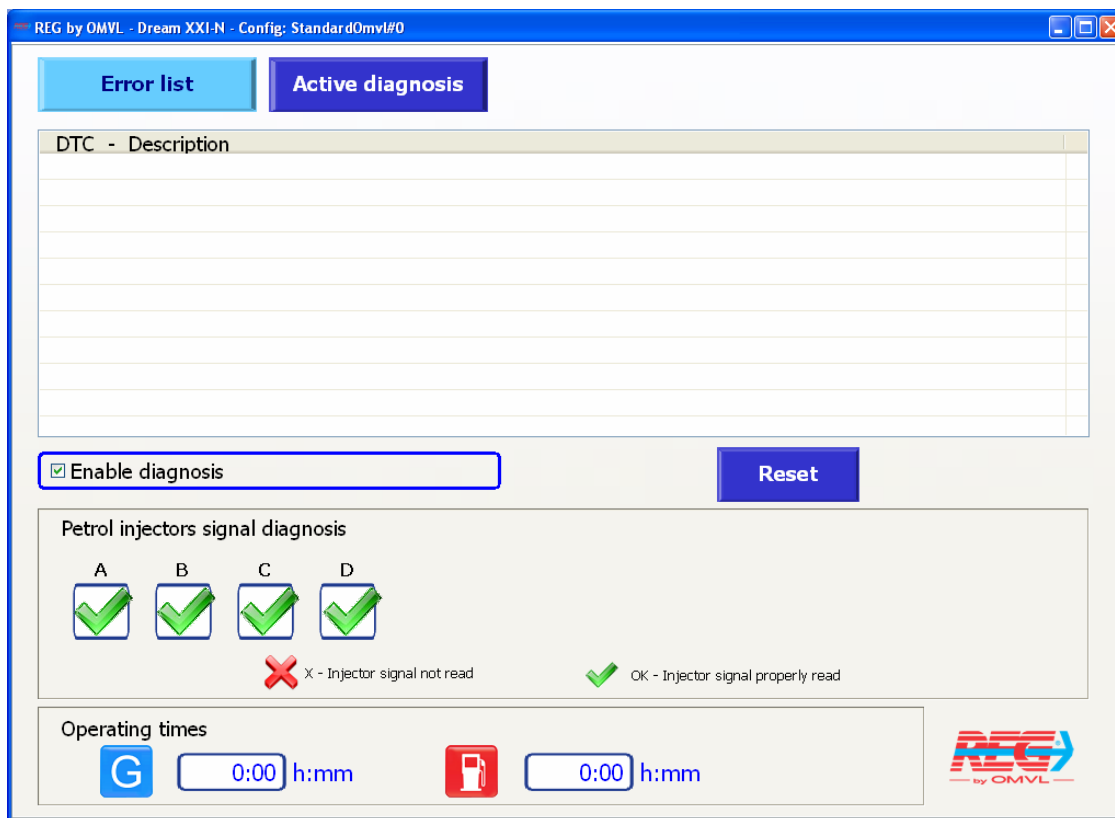
- **RPM for petrol addition and operation:** these speeds define the range where the petrol back-up applies.
- **Petrol injection time for petrol addition and operation:** this is the threshold that defines the range above which the petrol back-up applies.

Note: the change-over switch doesn't show any petrol back-up. You can tell that the feature is on because its box glows in yellow (Petrol addition) or red (Petrol), and gas injection times will go to zero, on the Status panel.

Suggestion: solenoid valves will stay on, during petrol back-ups. So, please take care that any time advancer powered by the blue wire, would stay on.

5 Diagnosis

Dream XXI-N ECU diagnostics constantly monitor sensors and actuators. Any detected failure is reported on the Error list of the Diagnosis page:



Enable diagnosis: the diagnostics feature are disabled by default, and the ECU will not detect or react to any failure. You can enable these features selecting the check-box.

Reset: this button clears the list of diagnostic trouble codes from memory.

Note: in case a failure is still present, the relevant trouble code would be listed again.

Petrol injector signal diagnosis: connection of petrol injectors is graphically represented in this box. Faulty connection is represented by a red “X”, while good ones by a green check-mark.

Operating times: this counters show the overall time the system run on petrol and on gas. The counters can not be cleared.

5.1.1 Diagnostic Trouble Codes

When the Dream XXI-N ECU detects a failure, it performs an action corresponding to the error detected. The possible trouble codes and actions are these:

| DTC description | Action |
|-----------------------------|------------------|
| Gas injectors | Change to Petrol |
| Petrol injectors connection | Change to Petrol |
| Tank solenoid valve | Change to Petrol |
| Reducer solenoid valve | Change to Petrol |
| | |

| DTC description | Action |
|--------------------------|------------------|
| Gas pressure sensor | Change to Petrol |
| Map sensor | Change to Petrol |
| Gas temperature sensor | Change to Petrol |
| Water temperature sensor | Change to Petrol |
| Switch present | None |

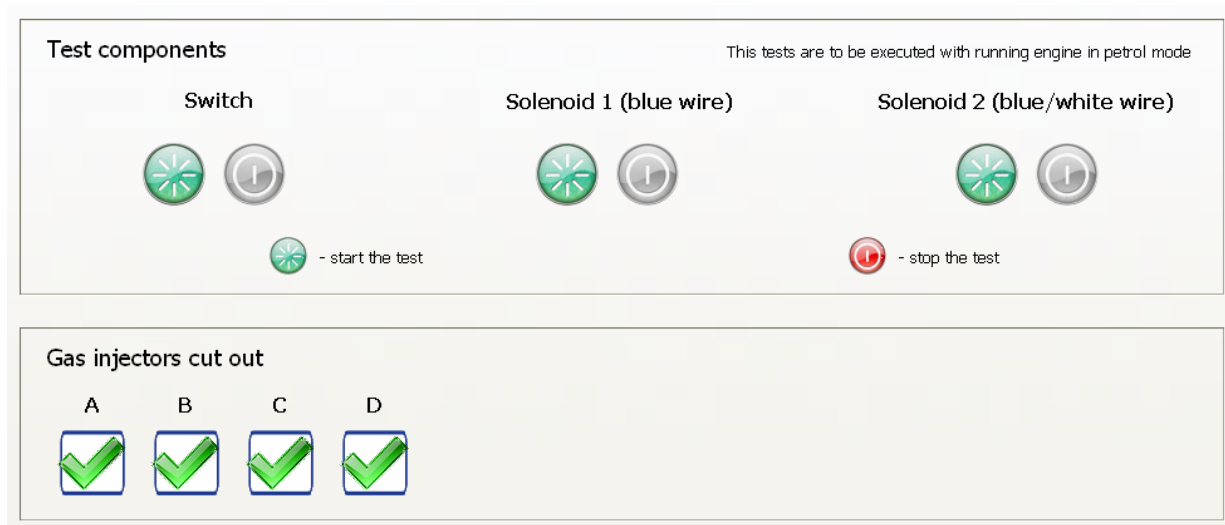
The ECU reacts to critical errors listed above and automatically switches to petrol; to return to gas, it is necessary to shut down the engine, fix the relevant failure and start the engine again.

5.1.2 Diagnostic alarm

When the Diagnosis is enabled, any fault is signalled by the change-over switch, with slowly flashing LEDs and alarm sound. To deactivate the alarm, press the switch button.

5.2 Active diagnosis

The second page of the Diagnosis window lets you do some diagnostic test. When opening this page, a pop-up message warns you that improper use of these features could damage the system.



5.2.1 Test components

Switch: click on the green button to start the testing of the change-over switch. All LEDs will flash and the alarm sound will be fired. To stop the test, click the red button.

Solenoid 1: this feature lets you test the functionality of solenoid valves connected to the blue wire. Click the green button to power the solenoids; the red button will stop the test.

WARNING: testing safety valves of a non-properly installed system could cause gas leakages. Perform this test only with the engine off.

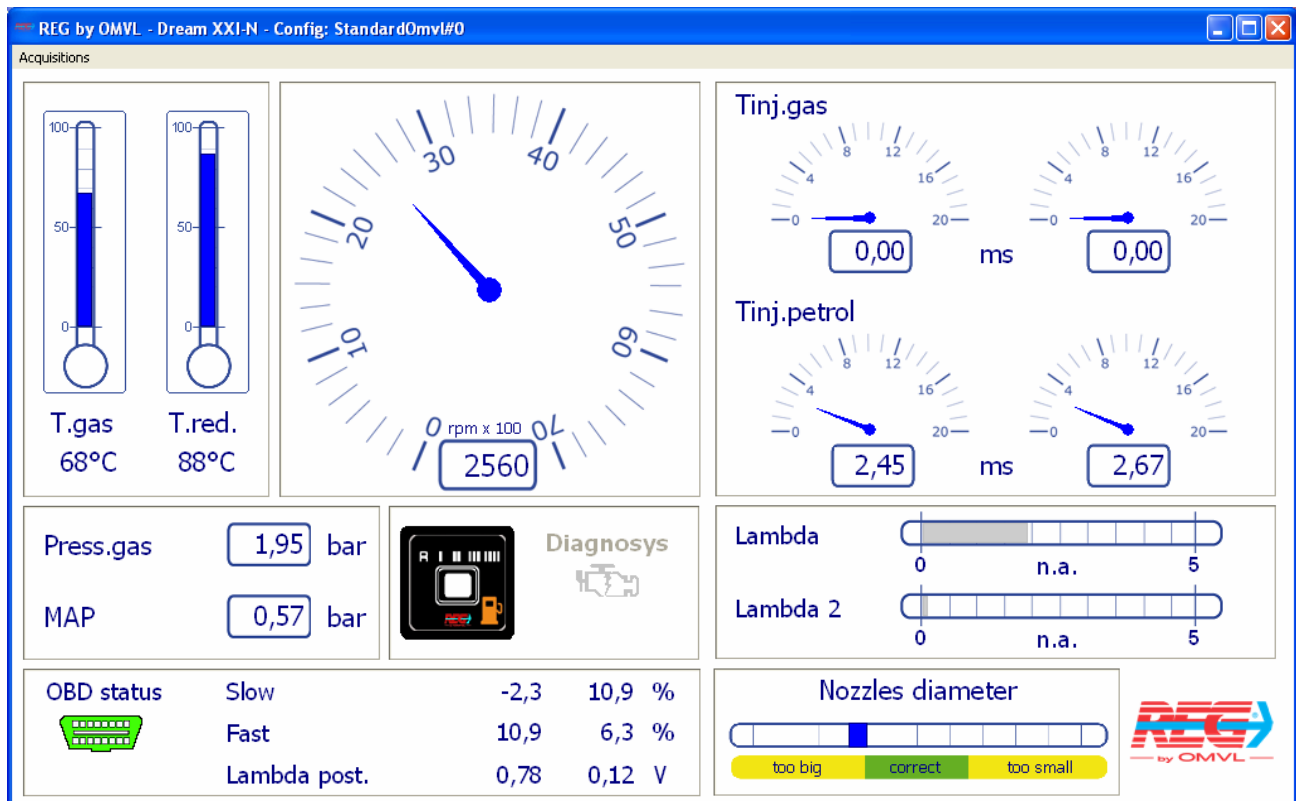
Solenoid 2: Click the green button to power the solenoids connected to the blue/white wire. The red button stops the test.

Gas injectors cut out: this feature lets you cut-out a gas injector, while the engine is running on gas. The corresponding petrol injector will be activated, so the engine will continue to run on gas, except for that cylinder, that will be fuelled by petrol.

While the injector is cut-out, its box will show a red "X"; if you click it again, the gas injector will start working normally and its box will show a green check-mark.

6 Display

This page has gauges that display all real-time readings acquired from the Dream XXI-N ECU:



T.gas: temperature of gas, inside the rail

T.red: temperature of water, in the pressure reducer

Revs: engine's revolutions per minute, in RPM

Tinj.gas: gas injection time, for bank 1 on the left and bank 2 on the right (if available)

Tinj.petrol: petrol injection time for bank 1 and bank 2

Press.gas: pressure of gas in the rail

MAP: Manifold Absolute Pressure

Change over switch: it's a software replica of the real switch installed inside the car

Diagnosis: this normally grey icon blinks in red only when the ECU detects a diagnostic fault

Lambda: voltage of the first lambda oxygen sensor (optional connection)

Lambda 2: voltage of the second lambda oxygen sensor (optional connection)

OBD status: the icon shows the current status of OBD connection (Strike-thru, blinking or green)

- **Slow:** slow fuel trims of the petrol ECU, bank 1 and bank 2
- **Fast:** fast fuel trims of the petrol ECU, bank 1 and bank 2
- **Lambda post.:** voltage of the post-cat lambda sensors, acquired from the OBD connection

Nozzles diameter: this gauge suggests if the flow rate of gas injectors fits the engine

6.1 Acquisitions

On the top of the Display window, the **Acquisitions** menu lets you manage data-logging:

- **Start saving:** immediately starts saving the data acquired in real-time for the ECU, into a temporary file in your hard-drive. The Acquisitions menu will blink in green.
- **End saving:** stops the acquisition and saves the data-log into a file. A file dialog lets you give a name to the file.
- **Display graph:** opens a graph that shows the plotted charts of previously saved data. You can choose the data-log file from a file dialog
- **Send by e-mail:** opens your e-mail software and creates a new message with a data-log file attached. You can choose the file from a file dialog.

Note: data-logs are plain text files, with rows starting with a time stamp and logged values separated by tab chars. You can open this files and edit them with any software, like Exel.

6.1.1 Display graph

This command of the Acquisition menu shows the plotted chart of a data-logging:



The X-axis shows time in seconds, while the Y-axis shows the value of the measures; each measure is plotted in a different trace, with different color.

A Table on the top right corner lists the plotted traces, with their own scale.

Zoom in: you can zoom in a portion of the graph by clicking the LEFT mouse button on it, and dragging the selected area from left to right, top to bottom. You can further zoom-in repeating this operation.

Pan: while zoomed-in, you can pan the chart in any direction by clicking the RIGHT mouse button and dragging the chart to the desired direction.

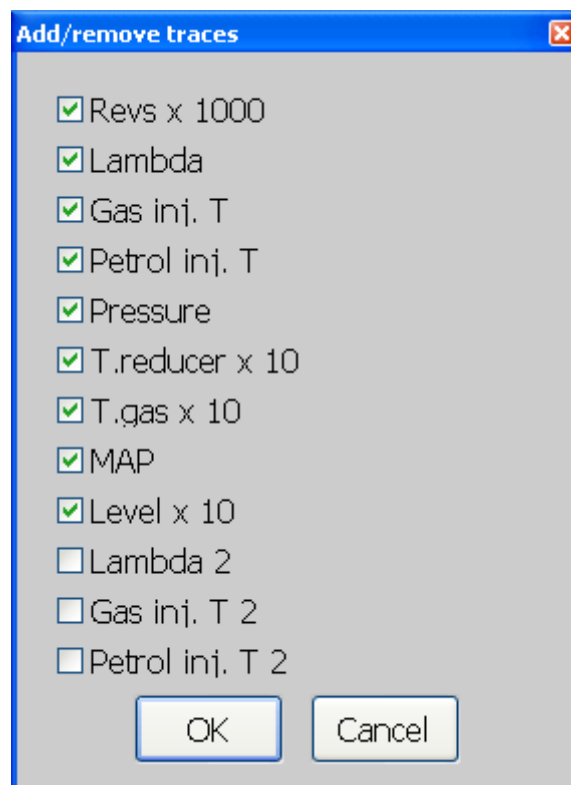
Zoom out: while zoomed-in, you can zoom-out to see the whole chart by clicking the LEFT mouse button on it, and dragging a selection area from right to left, bottom to top. Alternatively, you can use the Cancel zoom command from the Graph menu.

Graph menu

- **Trace manager:** opens the trace manager
- **Print:** opens a print dialog that lets you print a hard-copy of the graph.
- **Cancel zoom:** zooms out and shows the complete chart
- **Exit:** exits the graph and goes back to Display page.

6.1.2 Trace manager

This command of the Graph menu opens a window that lets you select which traces you want to plot on the chart:



7 ECU update

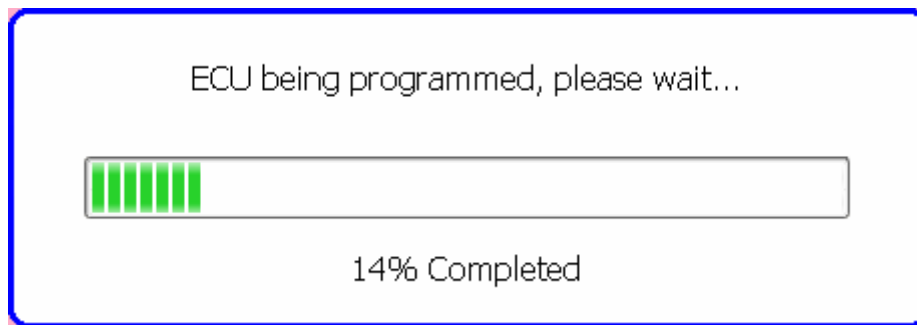
To update the firmware of an ECU, click on the **ECU update** button on the main window. A file dialog opens, showing you the firmwares found in your Documents\OMVL\Firmware folder.

Only firmwares compatible with the currently connected ECU are displayed.

You should always select the latest available firmware; the latest firmware versions are automatically copied to your hard drive, during software installation.

When you click the Open button of the file dialog, the software will ask confirmation and then start programming the ECU; a progress bar will show the percentage of completion.

Usually the programming takes up to 3 minutes.



Once finished, the software will restore the previously saved configuration of the ECU.

WARNING: for no reason the programming should be interrupted before 100% completion, otherwise the ECU will not work anymore. Always check that the battery of your laptop is fully charged, before starting an ECU update.

7.1 Emergency procedure

If, for some reason, an ECU does not work nor communicate anymore, because of incomplete update, you should perform this **emergency procedure**:

- 1) Remove the 10A fuse installed on the red/black wire, connected to the battery
- 2) While the fuse is removed, start the ECU update procedure and select the proper firmware
- 3) Once the procedure has started, quickly put the fuse back in place: you have few seconds, otherwise the software won't find the ECU and abort the procedure. If you fail, you should try again from the start.
- 4) With the fuse back in place, the ECU wakes up and starts its emergency programming procedure. The usual progress bar will show you the percentage of completion.

Once the programming is 100% completed, the ECU will start working normally again.

Note: the emergency procedure clears the previously stored configuration. The ECU will then have the default factory configuration.

OMVL spa



Components

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