PowerBox Digital - installation and tuning (making your own maps)

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📝 **-** important things, essential to understand the principle of functioning and correct use

⚠- steps at which tuners most often make mistakes

🤓🎓- more difficult theory, not necessarily needed, but expands knowledge

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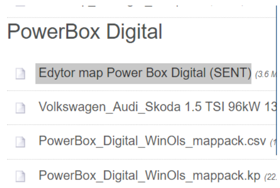
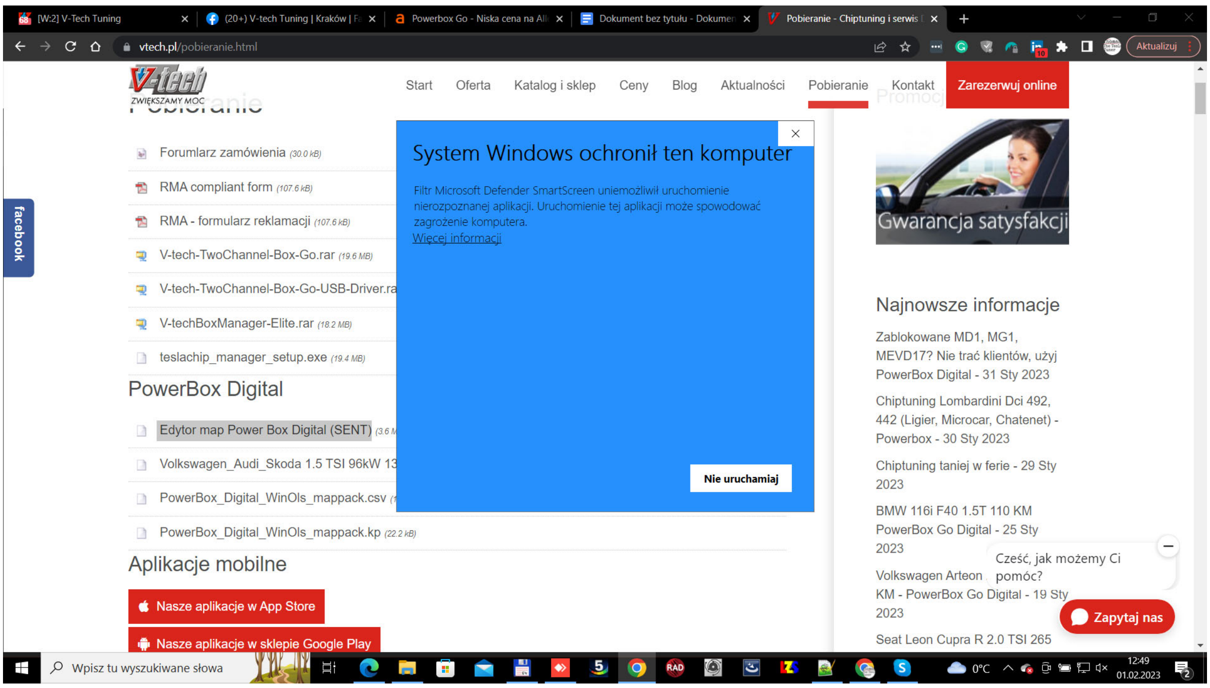
1. Installing the software (editor) for Windows



From the "Downloads" page, download the PowerBox Digital map editing program (**Power Box Digital Map Editor (SENT)**) to your computer.

https://vtech.pl/pobieranie.html

The editor does not require installation and will run immediately.
If Microsoft Defender displays a blue screen (it does not know this app) then we click "More information" and the "Run anyway" button. This is a common behavior of Windows when we open an unfamiliar program. Of course, it does not mean a virus, but when Windows is set to an elevated level of user protection, this is how it will behave:



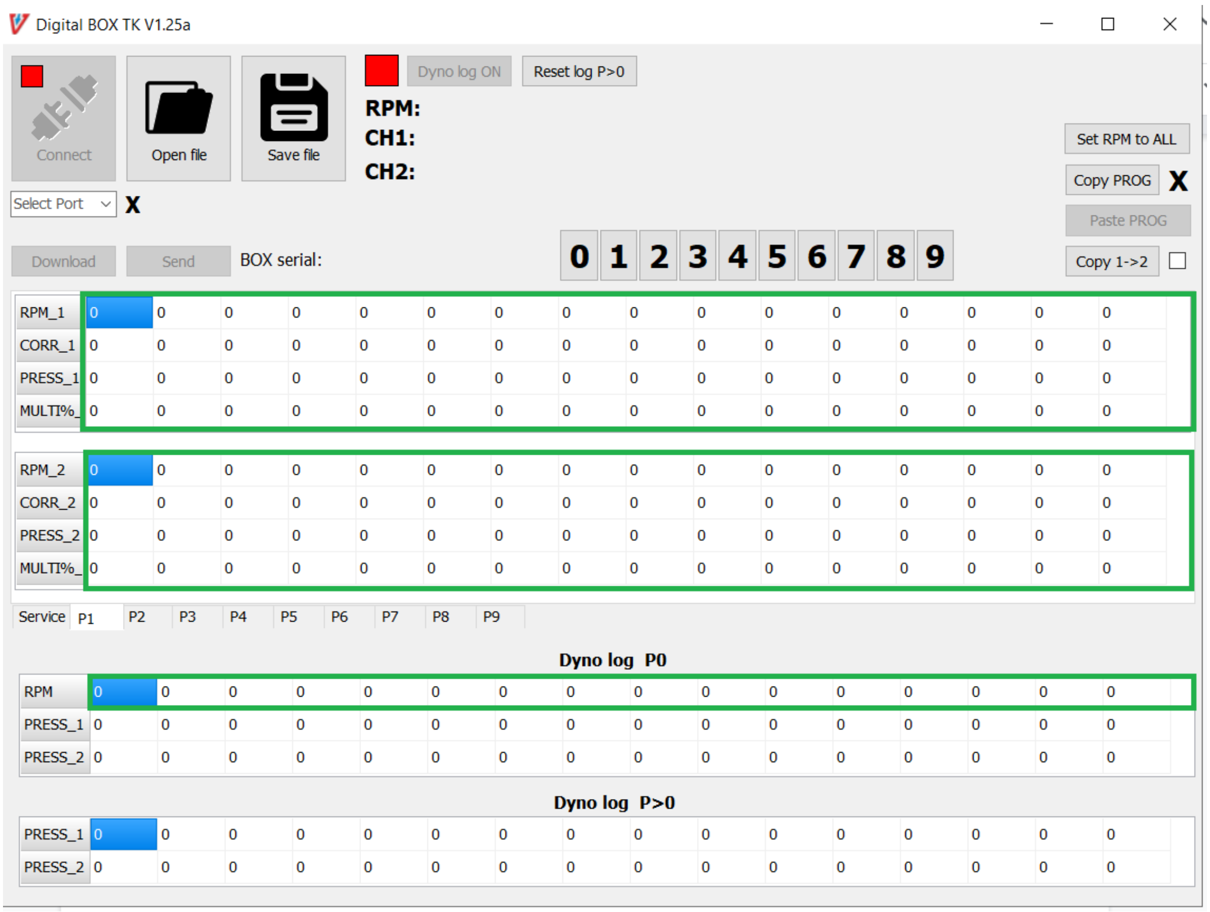
In addition, we have a sample set of maps for the VAG 1.5 TSI for download, and a mappack for those who prefer to edit **PowerBox Digital maps in WinOls**. The maps are either *.kp (mappack) or alternatively *.csv (map list in csv), which allows you to open the maps even in the Demo version of the **WinOls** program.

*📝 In this guide, however, **we are not using WinOls**, but an **editor provided by V-Tech Tuning**, downloaded from the site vtech.pl*

2. First steps - buttons, keyboard shortcuts

The map editing program has only one screen - both the tuning and preview of PowerBox operation, as well as the logger for logging sensor data when measuring on the dynamometer or on the road are on a single screen.
All data except logging results are editable (can be changed). They are marked here in green (in the real program they are not marked).

The next "green" blocks are a set of maps of the first channel (sensor), the second channel, and the rotation axis for the logger. Below appear the logging results on program 0 (box off, serial car), and on the program we selected.

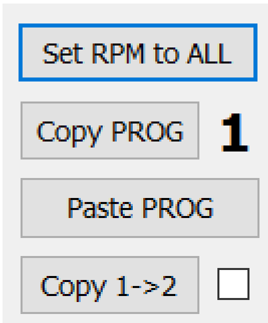


Connect - connects to the box (the available port will appear in "**Select Port**" when the box is connected to the computer. A green light on the button indicates that the box is connected.

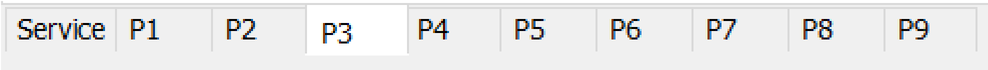
Open file and **Save file** - allow us to load a set of maps, or save them on a drive. Sample tuning maps for Volkswagen 1.5 TSI are available for download on our website:
https://vtech.pl/pobieranie.html
Read BOX - reads a set of maps from the device. To start editing the current settings of the device we just use **Read BOX**. However, if you want to read a set of maps from the device and save them to a hard drive, connect to the device after connecting the box, read its maps using the **Read BOX** button, and then save them to disk using the **Save file** button.
Write BOX - saves the maps to the device. When you make changes to the maps or axes, press **Write BOX** to save them to the device. This can be done at any time for analog sensors, while taking your foot off the accelerator (you do not need to turn off the car). ⚠Dla SENT digital sensors, you need to turn off the engine and upload maps with the ignition on - otherwise errors may appear. If you want to save the maps from a hard drive to the device, open them with the **Open file** button, and then save them to the device with the **Write BOX** button.

Dyno log ON - enables logging of data from both channels. The light next to the button shows whether logging is on (green) or off (red). If the "0" program is selected (box off, car serial) then the sensor data will log just below the logger's RPM axis. If a program other than zero is selected, then the data will be saved at the very bottom, although the rotation axis is the same as in the logger block for the zero program.
Reset log P>0 - clears the logging data for a non-zero program. If you do not clear them, the data will be successively overwritten.
Buttons [0] - [9] - select the currently used program.

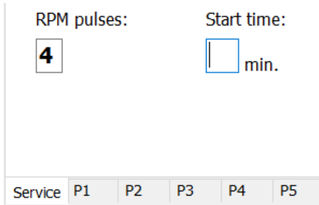
> ⚠It is necessary to distinguish the tabs P1 ... P9 below the second sensor block - they don't select the active program, but the program you are currently editing.



Set RPM to ALL - copies the RPM axis from map 1 (sensor 1) to all other maps in all programs. Thus, it is enough to prepare the RPM axis in one map, if we assume to use the same axes in the others.
Copy PROG - copies the current program to the clipboard. We can then select another program with the **P1-P9** tab and paste the program.
Paste PROG - pastes the program from the clipboard.
Copy 1->2 - copies map 1 (top) to map 2 (bottom). If checker is checked , the program will be immediately loaded into the Powerbox (this corresponds to pressing Write BOX). This speeds up the work on maps in gasoline cars in case you want both maps for pressure sensors to be identical.
AutoFill (requires activation of **Enable AutoFill** to avoid accidental clicking) - the current program will be moved to position P9, and then the programs will be filled with CORR values from 60% (P1) to 95% (P8). This allows us to quickly generate intermediate programs, assuming that the one we have prepared is the strongest.
P1 - P9 - (tabs below the maps) select the currently edited program. Note that in order for the editing result to be in the PowerBox, you must then press Write BOX



when the car is at idle (analog sensors only), or with the engine off (when at least one sensor is digital, SENT type).



Service(tab) - here, in the **RPM pulses** setting, we set the number of signals in proportion to the engine speed so that the PowerBox correctly shows the engine RPM. Popular values are. 3 - diesel TDI, 4 - TSI, TFSI. The known values for us are **1,3,4,5,6**. We observe the RPM at the top of the program screen (RPM:). Pre-made programs from us have the correct value of RPM pulses entered right away.

Warmup time - It is used to **delay the activation of tuning**. You can give the engine, for example, 1-2 min of time with factory power to stabilize oil pressure and warm up slightly when cold. 📝Delay is healthy for the engine, but not necessary, ⚠poza Mercedes GLC (X253 FL) 43 V6 AMG 287kW 390KM (2019 -), where it should be set to 1 (1min). Otherwise, this car may ignite with a disturbance in the form of raising the RPM after starting).

⚠To save changes, press the **Write BOX** button.

Keyboard shortcuts:

Kleys	**Operation**
Ctrl + C	**Copy the program to the clipboard (both maps, including axes)**
Ctrl + V	**Paste from clipboard**
Ctrl + ➔	**Copy the value to the end of the line (to the right)**
Ctrl + 🡰	**Copy the value to the beginning of the line (left)**
Ctrl + 0	**Reset the entire line to 0**
Shift + ➔	**To the right set 75%, 50%, 25%, 0% of the value you stand on**
Shift + 🡰	**To the left set 75%, 50%, 25%, 0% of the value you are standing on**
Ctrl + 🡱	**Increase by 10**
Ctrl + 🡳	**Decrease by 10**
Ctrl + Shift + 🡱	**Whole line +1%**
Ctrl + Shift + 🡳	**Whole line -1%**

3. Connecting PowerBox Digital to Windows PC, uploading pre-made program

We unbolt the PowerBox Digital and plug it with a USB-microUSB cable to a Windows computer. The drivers will install automatically. The green LED inside the device lights up, informing us that it is powered. Video: https://youtu.be/0ii33OmVnII

The most common simple actions are:

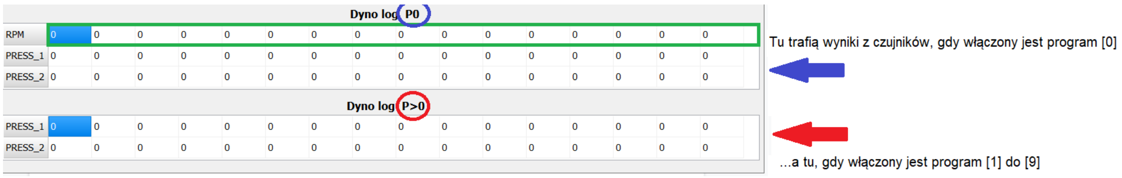
- **Reading the device**: If we want to read the maps that are in the device, we press Download. The device must be connected.
- **Ready to use axes**: If we don't want to waste time manually typing in axes, we can download pre-made axe sets from the "Download" page (the maps will be blank). For a diesel it is Axis_Only_Diesel.bin , while for a gasoline car it is Axis_Only_Gasoline.bin . After saving them on the device with the Send button, press Download - then the RPM axis will also be copied to the logger. *The RPM axes are set a bit denser in the 1500-2500 rpm range, because that's where the turbocharger pressure builds up rapidly.*
- **Uploading the "pre-made"**: If you want to save the program from a drive to the device, you load it by pressing Open file, and then save it to the device by pressing Send. *We use this method when we want to load a pre-made set of maps, prepared by someone else (e.g. V-tech Tuning), and we do not want to deal with map editing, but only adjust PowerBox to work with a specific engine.*

⚠If we make changes to the selected maps then we save them to the device by pressing Send, or on a hard drive by pressing Save file. Otherwise, the changes are only visible in the editor and when we close it, they are lost.

The most common use is **Write BOX** when tuning, and the ready final version is also saved to a hard drive using **Save file**, as you can then use the same settings on another car with the same engine.

4. Logging

The logging function makes our work easier, as it allows us to observe changes in sensor measurement results as a function of RPM before tuning (when the [0] button is pressed and highlighted in
blue is the [0] button, program zero), or when we measure data on program [1] to [9]. Data for the zero program is collected in the upper logger window, and for the non-zero program - in the lower window.



On the RPM axis, labeled RPM on the left, we will be able to set any increasing RPM of the engine, and when logging for this particular RPM we will record the results from two channels (sensors). They are labeled PRESS_1 and PRESS_2.

Depending on what we have pinned as the sensors whose readings we want to modify, the result of the measurement can be either charge pressure (for SENT digital sensors) or **tension on the sensor** (for **analog sensors**). These are the actual measured data, regardless of whether the box program modifies the sensor signals or not.

Example: we modify two analog signals from pressure sensors upstream and downstream of the throttle in TSI. Our program number **[1]** raises the boost pressure. In the logging for program **[0]**, we should have values lower than in the logging for program **[1]**.

When repeatedly logging on the tuning program, you can clear the measurements with the Reset log button P>0 and then the cells will successively fill in with new results, replacing the zeros. If this is not done, the data will be overwritten.

To see a practical example of how to perform logging (and then - changes in maps and axes) it is worth watching the video: https://youtu.be/h0IJkSGiRtY

5. Utilizing the results of logging

We will use the logged factory pressure data to prepare the PRESS_1 and PRESS_2 pressure axes. We can fill these axes with data from the first and second lines of the log, respectively, with the largest logged values to the right and zero to the left. Of course, we can widen the scale of pressures a bit, after all, we are going to raise them, and a certain reserve will come in handy.

Let's see it with an example of a 1.2 TSI with analog sensors:

First we did a logging of the serial pressures of the intake manifold pressure sensors (PRESS_1) and before the throttle (PRESS_2). The readings should be very close, as long as the throttle is fully open (we press full acceleration when logging).

RPM	1000	1250	1500	1600	1700	1800	1900	2000	3000	3250	3500	3750	4000	4250	4500	7000
PRESS_1	1309	1408	1546	1658	1754	1945	2143	2222	2242	2181	2197	2222	2263	2132	2120	0
PRESS_2	1311	1399	1551	1685	1769	1964	2159	2253	2211	2195	2218	2247	2216	2080	2036	0

Since pressures below atmospheric pressure (about 800mV) will not be modified by us, we will start PRESS_1 values at 1000mV.

RPM_1	1000	1250	1500	1700	1800	1900	2000	2100	2200	2300	3000	3750	4000	4250	4500	7000
CORR_1	0	0	0	-200	-250	-300	-300	-300	-300	-300	-300	-300	-300	-300	-300	-300
PRESS_1	1000	1100	1200	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2950	3100	3250
MULTI%_	0	0	0	0	0	0	20	40	60	80	100	100	100	100	100	100

RPM_2	1000	1250	1500	1700	1800	1900	2000	2100	2200	2300	3000	3750	4000	4250	4500	7000
CORR_2	0	0	0	-200	-250	-300	-300	-300	-300	-300	-300	-300	-300	-300	-300	-300
PRESS_2	1000	1100	1200	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2950	3100	3250
MULTI%_	0	0	0	0	0	0	20	40	60	80	100	100	100	100	100	100

6. Map construction for a single sensor, principle of functioning

Each sensor has two maps, correcting its characteristics. Both maps are grouped into a block with four lines of data. The first two lines are the RPM axis for signal correction and CORR sensor signal correction.

RPM_1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CORR_1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PRESS_1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MULTI%_	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

The next two are the axis of the pressure, measured by this PRESS sensor (this is the pressure truly measured if the sensors are digital, SENT, or the voltage value on the sensor if they are analog) and the percentage correction MULTI% of the CORR signal.

🤓 🎓 If we use the classical formulation of the function: y = F(x), where x is the measurement from the sensor and y is the new sensor signal after correction, sent back to the ECU, we have:

$$y = x + CORR(RPM) \cdot MULTI\,\%(PRESS)$$

As you can see, when MULTI% is zero, the correction is zero (multiplication is performed before addition). The (+) sign was used because CORR(RPM) should contain negative values (how much to lower the measured indication). Adding a negative number to x means subtracting the calculated correction from x.

For a better understanding of how maps work, let's first look at CORR itself (that is, the correction of the sensor signal depending on RPM):

1. Let's suppose we have SENT sensors in the car.
2. Let's let the rpm be 3000 rpm.
3. The ECU sets the pressure to 2000 mbar, because that's what it has set in the "Boost" (boost) map.
4. The sensor measures the boost pressure. It would show 2000 mbar from vacuum (1 bar of boost) if not for the correction. Let the CORR correction be -300 mbar.
5. The output to the ECU would issue a signal lowered by 300mbar from the actual. So the engine controller (ECU) will raise the pressure by 300 mbar as it strives for the set 2000 mbar and as a result we have 2300 mbar (1.3 bar of boost).

Note that the actual pressure readings are measured in the logger and there you will see the true 2300 mbar.

1 bar (= 1000 mbar) of boost is 2000 mbar from vacuum, because the pressure that surrounds us is 1 bar from vacuum, or 1000 mbar. The boost pressure is calculated from the pressure that surrounds us, while the car's sensor measures it from the vacuum - and hence the result is 1000 mbar higher

As you can see, we can set any boost as a function of RPM, but it does not depend on engine load. The problem would arise when someone drives calmly at high rpm, or even lowers the acceleration. The pressure signal would still be corrected, and the pressure would always be 300 mbar more than that set in the ECU.
This is where MULTI% correction, which depends not on RPM, but on pressure, comes to our aid.
It can have values from 0 to 100% (numbers from 0 to 100). If the boost pressure is high (say, just 2000 mbar) then MULTI% can be set to 100. Then the engine ECU at CORR = -300mbar will actually set the boost pressure higher by the absolute value of CORR.

On the PRESS axis is the parameter (usually air pressure or fuel pressure) that we modify with the correction in CORR, while its value is not changed (it is as much as the sensor indicates). This allows us to correct the "strength" of our tuning also in the function of a value of the modified parameter.
High pressure - a large correction. Small - small or none. We set this correction in MULTI%.

For example, if the boost is 0.7 bar (1700 mbar on the sensor), then we can set MULTI % = 50. Then the pressure correction is only half of the CORR, or 150 mbar.
If we set MULTI% = 0 for a pressure of 0.5 bar or less, then there will be no change in boost pressure, because 300 mbar * 0% = 0 mbar. The pressure for an unloaded engine (lower boost) will remain as with the factory settings.

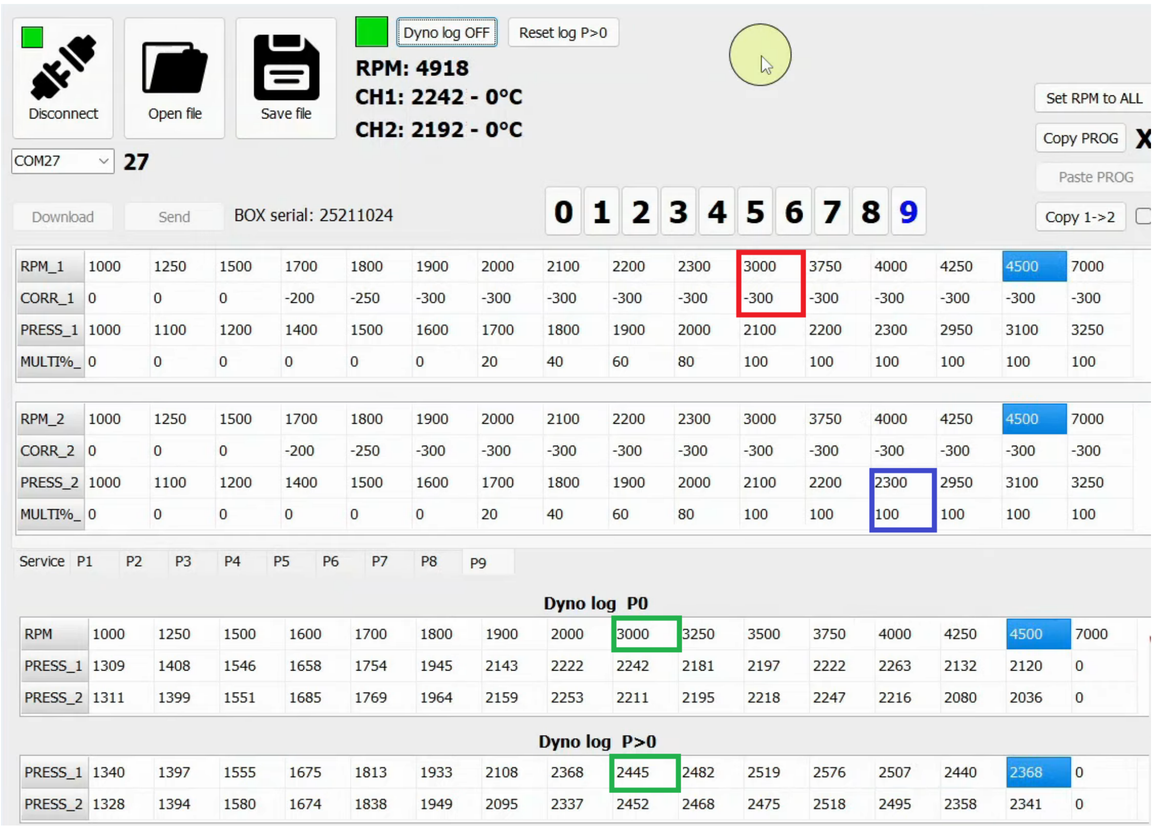
📝 *The arrangement of these two linear maps actually creates a three-dimensional map. This is a three-dimensional map of boost correction in function of engine RPM and load realized in a simplified way, speeding up the tuner's work.*

📝 *This formulation was also invented to speed up the conversion of maps from WinOls to PowerBox Digital (this is described in our second tutorial).*

7. Example of calculation of correction from a pre-made tuning map (1.2 TSI)

Volkswagen 1.2 TSI, analog pressure sensors, measurement in mV, maps shown provide simple tuning, +20 hp):

Question 1: By how much was the boost pressure raised for 3000 rpm and full acceleration?



RPM_1	1000	1250	1500	1700	1800	1900	2000	2100	2200	2300	3000	3750	4000	4250	4500	7000
CORR_1	0	0	0	-200	-250	-300	-300	-300	-300	-300	-300	-300	-300	-300	-300	-300
PRESS_1	1000	1100	1200	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2950	3100	3250
MULTI%_	0	0	0	0	0	0	20	40	60	80	100	100	100	100	100	100

RPM_2	1000	1250	1500	1700	1800	1900	2000	2100	2200	2300	3000	3750	4000	4250	4500	7000
CORR_2	0	0	0	-200	-250	-300	-300	-300	-300	-300	-300	-300	-300	-300	-300	-300
PRESS_2	1000	1100	1200	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2950	3100	3250
MULTI%_	0	0	0	0	0	0	20	40	60	80	100	100	100	100	100	100

Dyno log P0

RPM	1000	1250	1500	1600	1700	1800	1900	2000	3000	3250	3500	3750	4000	4250	4500	7000
PRESS_1	1309	1408	1546	1658	1754	1945	2143	2222	2242	2181	2197	2222	2263	2132	2120	0
PRESS_2	1311	1399	1551	1685	1769	1964	2159	2253	2211	2195	2218	2247	2216	2080	2036	0

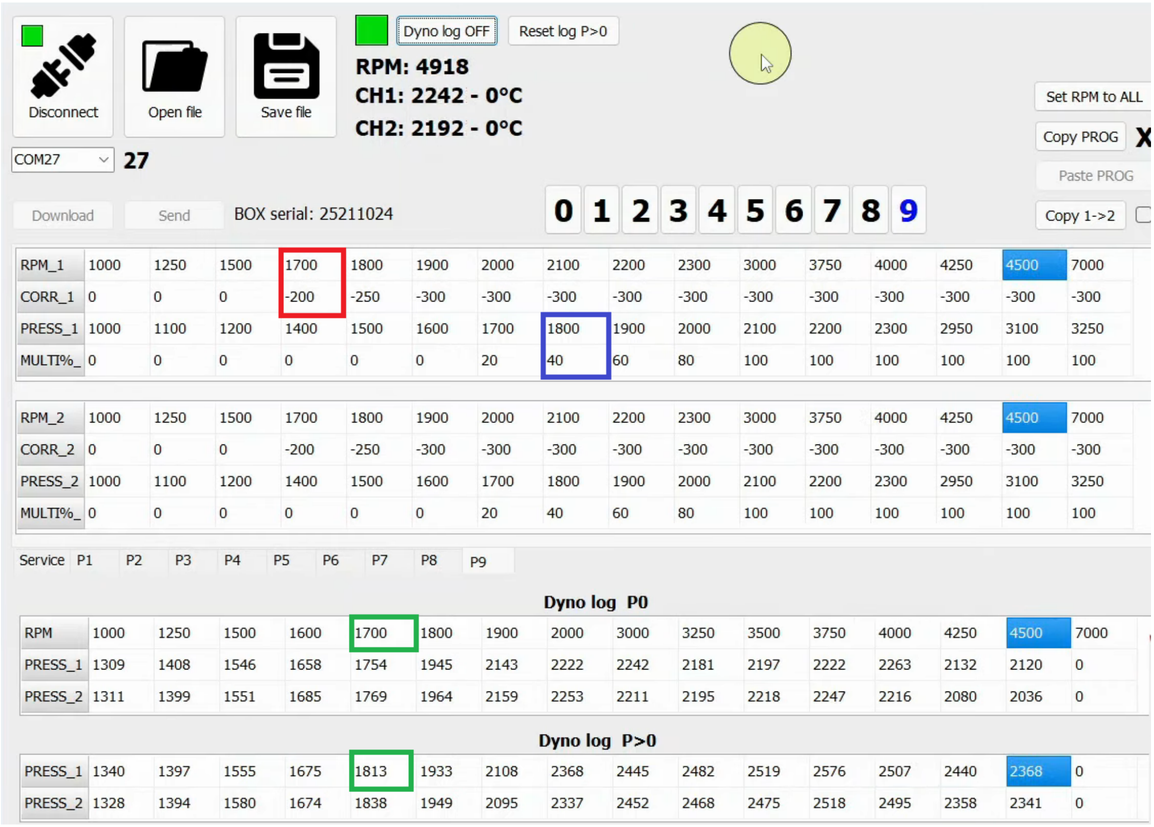
Dyno log P>0

PRESS_1	1340	1397	1555	1675	1813	1933	2108	2368	2445	2482	2519	2576	2507	2440	2368	0
PRESS_2	1328	1394	1580	1674	1838	1949	2095	2337	2452	2468	2475	2518	2495	2358	2341	0

Answer:
From the logging on the tuning program, we see that the post-tuning boost pressure is for 3000 rpm is 2445 mV. In the CORR_1 correction map, we see that the pressure sensor correction for 3000 rpm is -300 mV. However, it will be multiplied by the percentage resulting from the MULTI% map. But this map for pressures of 2300 mV or

higher (we read that the pressure is 2445 mV) contains a correction of 100% (that is, it does not affect CORR) it is ultimately -300 mV that will be the signal correction made.

Question 2: By how much was the boost pressure raised for 1700 rpm and full acceleration?



RPM_1	1000	1250	1500	1700	1800	1900	2000	2100	2200	2300	3000	3750	4000	4250	4500	7000
CORR_1	0	0	0	-200	-250	-300	-300	-300	-300	-300	-300	-300	-300	-300	-300	-300
PRESS_1	1000	1100	1200	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2950	3100	3250
MULTI%_	0	0	0	0	0	0	20	40	60	80	100	100	100	100	100	100

RPM_2	1000	1250	1500	1700	1800	1900	2000	2100	2200	2300	3000	3750	4000	4250	4500	7000
CORR_2	0	0	0	-200	-250	-300	-300	-300	-300	-300	-300	-300	-300	-300	-300	-300
PRESS_2	1000	1100	1200	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2950	3100	3250
MULTI%_	0	0	0	0	0	0	20	40	60	80	100	100	100	100	100	100

RPM	1000	1250	1500	1600	1700	1800	1900	2000	3000	3250	3500	3750	4000	4250	4500	7000
PRESS_1	1309	1408	1546	1658	1754	1945	2143	2222	2242	2181	2197	2222	2263	2132	2120	0
PRESS_2	1311	1399	1551	1685	1769	1964	2159	2253	2211	2195	2218	2247	2216	2080	2036	0

PRESS_1	1340	1397	1555	1675	1813	1933	2108	2368	2445	2482	2519	2576	2507	2440	2368	0
PRESS_2	1328	1394	1580	1674	1838	1949	2095	2337	2452	2468	2475	2518	2495	2358	2341	0

Answer:
From the logging on the tuning program, we see that the boost pressure after tuning for **1700 rpm** is **1813 mV**, and for these **1700 rpm** the pressure sensor correction is **-200** mV. However, it will be multiplied by the percentage resulting from the MULTI% map. But this map for pressures of **1800 mV** or higher includes a correction of 40% is ultimately just **40%** of -200 mV or **-80 mV** will be the signal correction

If you would like the vehicle to operate on the basis of a single map (one sensor) this is also possible, but then you lose the ability to control two parameters at once. In a situation where both sensors are boost pressure sensors (most gasoline cars), it is recommended to use the **Copy 1->2** button, which will allow you to quickly fill in the second map.

> ⚠In the event that our PowerBox in a diesel car, simultaneously modifies fuel pressure (and therefore fuel dose) on one channel and boost pressure on the other

(by plugging in the boost pressure sensor) then the use of map copying is pointless.

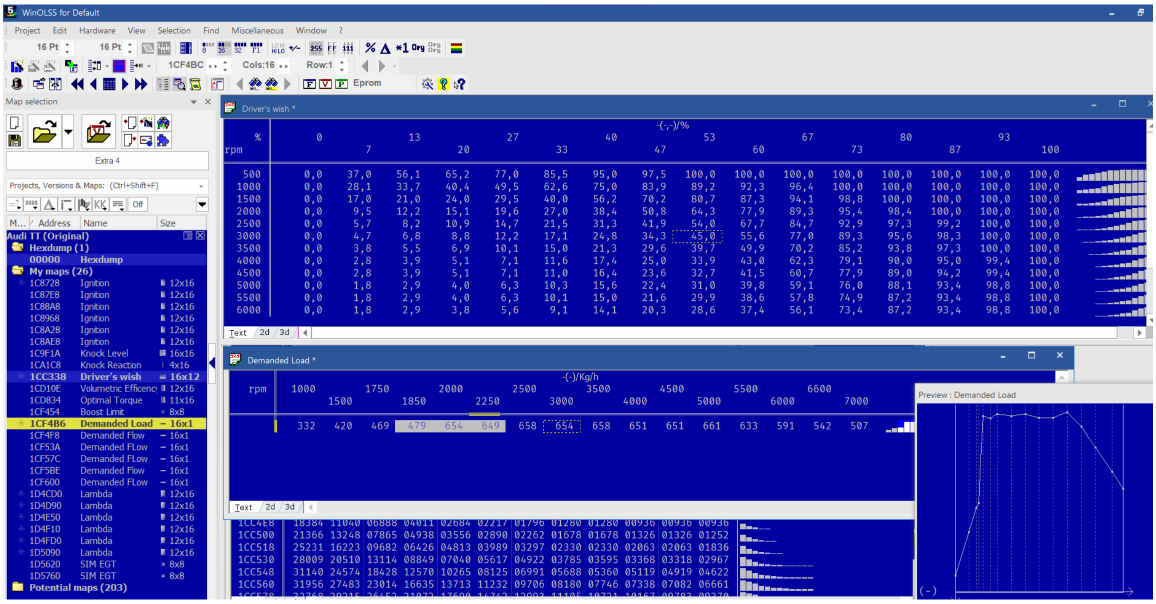
🧒🎓In our PowerBoxes, both maps and axes are interpolated (intermediate values are calculated). The signal changes are not made in jumps. If we set the MULTI% parameter for 1500 rpm to 0% and for 2000 rpm to 100%, and there is no additional point between these points, then for 1750 rpm the MULTI% correction will be 50%.

8. Stage 1 - gasoline (based on the original ECU map in WinOls)

In gasoline cars, the two sensors to be corrected are boost pressure sensors. They are located before and after the throttle. When we correct the boost, we must remember that when the engine load is low (50% and less) we should avoid correcting (raising the boost).

🧒🎓The fuel dose will be corrected automatically by the ECU to a certain extent, and we do not have to worry about a poor mixture. The correction will not come directly from the Lambda map in the ECU, but from the increasing pressure difference between the sensors upstream and downstream of the throttle. Lambda correction maps after the air flow estimated from the pressure difference will compensate for the increased amount of air. At the same time, the ECU will not enter areas of the Lambda map where the dose is very rich and which are depleted with chiptuning, and which it did not "visit" with the serial program. The ECU does not know that boost pressure is raised, but it does know that there is an excess flow of it.

To understand this fact and determine good areas of modification, it is best to use the actual program from the car's ECU, open in WinOls. The Audi TT 2.0 TFSI (a popular 200 hp engine) will serve as an example.
Below we have Demanded Load maps converted to airflow in Kg/h, and a Driver's Wish map, which is the percentage of Demanded Load to be realized depending on the position of the accelerator pedal.



As you can see, when you press the pedal halfway, the car will execute 45% of the 654 kg/h air mass. This is marked with a yellow border. Less than 300 kg/h will go to the engine. When we press 100%, it will, of course, be 654 kg/h. The requirement is always met, as long as it is physically possible. ltd.
The mass of air is quite accurately proportional to the boost pressure measured from the vacuum and to the torque. In this situation, if we raise the expected flow rate by 15%, the boost pressure will increase by 15%. If a sufficiently rich mixture is provided, power and torque will increase by 15%.

> 🤓 🎓 Power comes from torque. Engine power is torque * rpm.
>
> $$P = Tq \cdot rpm$$
>
> Whenever torque increases for some rpm by X percent, power also increases for that rpm by X percent

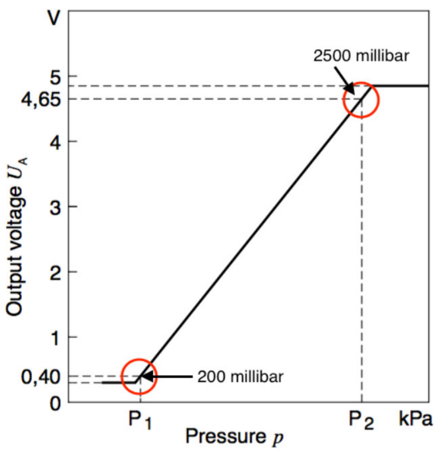
So much theory. And what are the conclusions from the Demanded Load chart?

- As the rpm increases, the manufacturer (VAG) expects less and less flow (and therefore torque). We should do likewise, and for rpm above 5000 we should reduce our tuning urges so as not to overload the turbo. Above 5000 rpm, therefore, we will lower the expected gain so that at 6500-7000 rpm it is no more than half of what we execute below 5000 rpm.
  📝*Above 5,000 rpm, do not increase performance "by force," because it can cause an error in the ECU.*

- The moment of stabilization of boost pressure (that is, with the accelerator pedal pressed to 100% - the moment of transition from the phase of accelerating the turbocharger and building boost pressure as quickly as possible to the phase of stable operation with constant boost pressure is marked in gray in the above screenshot from WinOls. It is always three cells of the map, a kind of "spike" at the beginning of the characteristics. We should not modify the boost in the first two cells of this "spike", because the stabilization of flow and boost after the pressure build-up phase (the so-called "interception") is already prepared by the car manufacturer and we want to use it. Hence, we will start the modification at 2250 rpm.

- We can modify earlier (according to rpm) but we have to throttle this modification with MULTI%, if the car does not have a high load (high boost pressure - of the order of 90% of the maximum serial, measured by the logger (on the zero program, the upper data in the logger).

Our characteristic, in which we set about -500 mV between 2250 and 5000 rpm and successively lower it to -200 mV for 7000 rpm will give us about a 20% gain in power and torque, without overshooting the turbo at higher revs. Theoretically, this should be slightly lower (see blue box below), but a small, excess performance gain will result from the depletion of the mixture (although it will still remain rich enough) and the resulting increase in engine efficiency



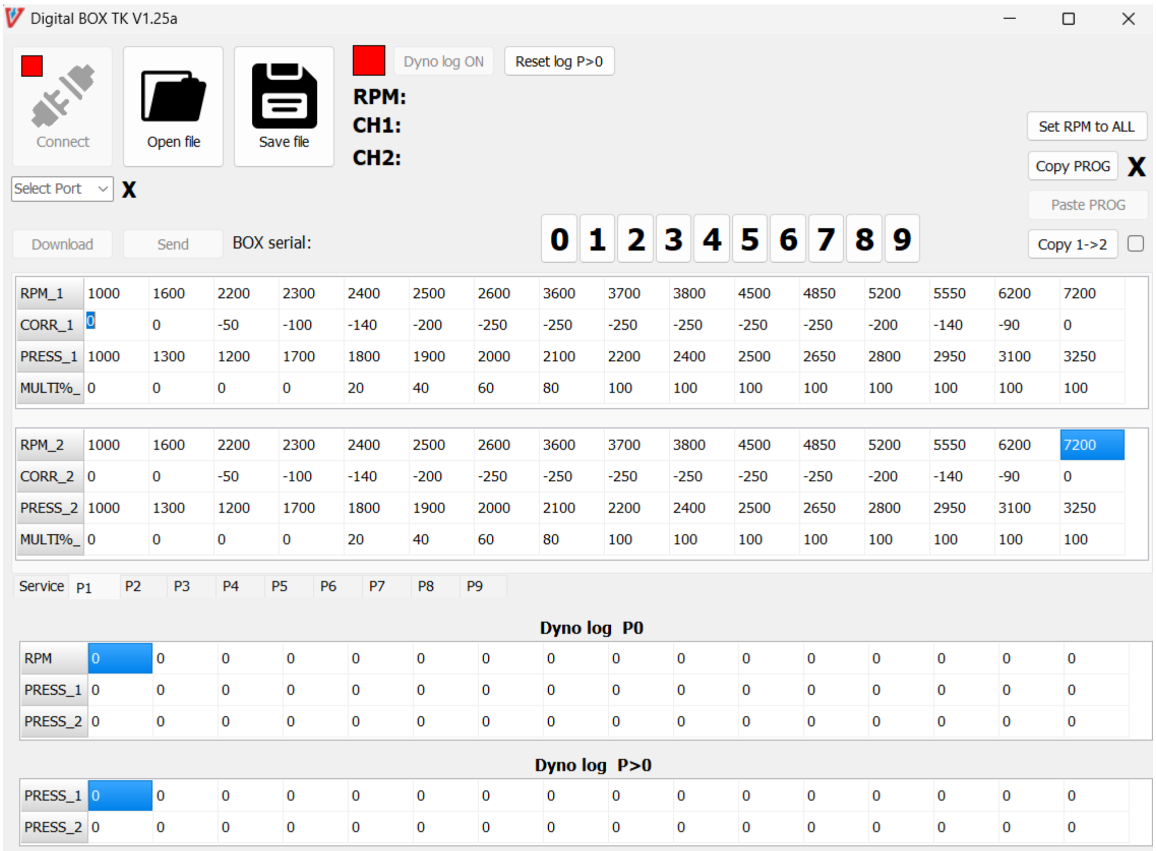
Next to it we have a typical characteristic of the MAP sensor Bosch 2.5 bar. if the pressure is 2500 mbar it will show 4.65V, and for a pressure of 200 mbar (vacuum, with the throttle closed) it will be 0.4V.
By performing the action:

$$\frac{(2500\,mbar - 200\,mbar)}{(4.65\,V - 0.40\,V)} ¿ 541\frac{mbar}{V}$$

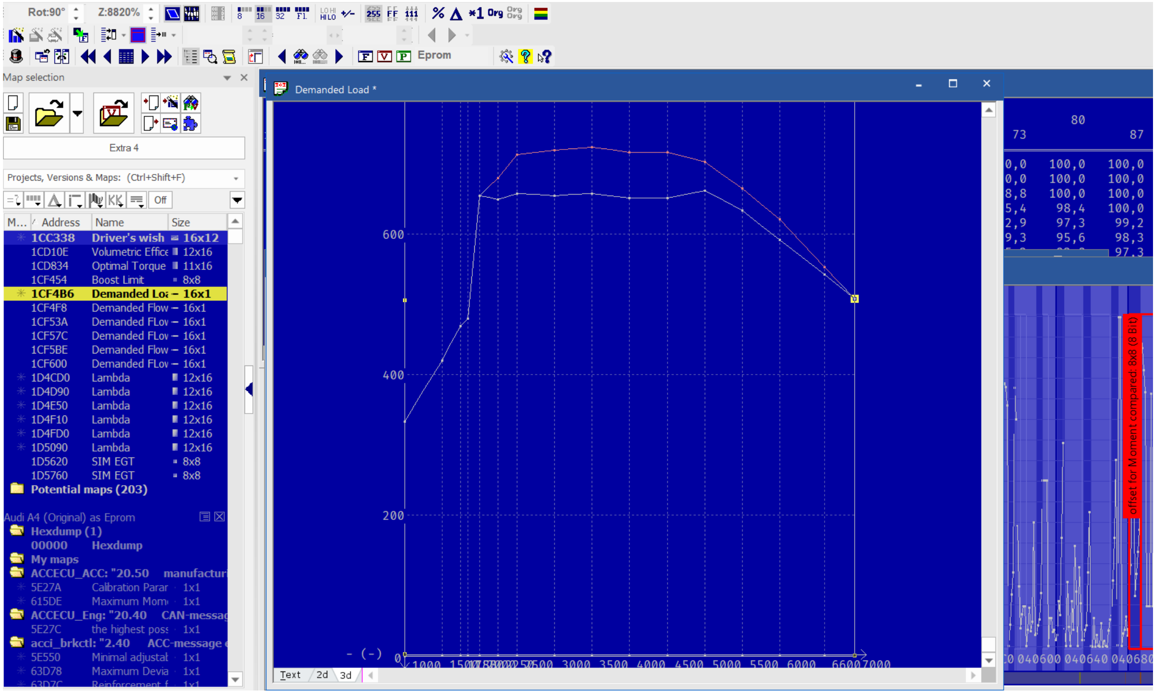
we establish that a typical MAP sensor up to 2.5 bar has 541 mbar (0.541 bar) per 1V. That is, a change of 1V is a change of 541 mbar. So by lowering the sensor reading by 0.5V (-500 mV we will enter in our PowerBox map) boost pressure (that is, also power and torque at this point) will increase by ½ of 541 mbar, or 270 mbar. A typical car about 0.8 bar of boost. That's 1800 mbar from vacuum.
In conclusion of this, its **power and torque with such modification will increase** by:

$$100\,\% \cdot \left(\frac{270}{1800}\right) = 15\,\%$$

A sample map from which we can start our adjustments, if it is not a "ready-made" downloaded from a tuner who tuned such an engine on a dynamometer, should be limited to a 10% increase in power and torque. On the dynamometer, we will see where we can afford more:



The CORR_1 setting (copied to CORR_2 using the **Copy 1->2** button) is based on the assumption that -250 mV corresponds to a 10% power gain.
The exact equivalent of such a Demanded Load setting (Flow/Torque depending on the driver version) in the chip (WinOls) is presented below:



Such a Demanded Load setting would produce an identical effect to the gain on the PowerBox, with the chip also needing to remove the torque limiters and deplete the mixture. This problem doesn't occur on the PowerBox because the ECU doesn't know that performance is being boosted. Don't exceed 15-20% power and torque gains on the device, because as engine noise increases (and the modern ECU measures and reacts to this) ignition will be retarded and efficiency will drop, or even fuel will be thrown extra into the exhaust. We then risk problems with excessively high exhaust gas temperatures. Hence, **the performance possible on the box is limited to an increment of +15 to +20%**, i.e. Stage 1. Higher performance is unacceptable, except in the few exceptions of cars with huge reserves (i.e. - it is possible, but it may not be healthy for the average car).

📝 *Starting the map creation with a 10% gain (shown above, and which, using PowerBox Digital, is achievable in practically every car) and testing the performance on the dynamometer, we can try to raise the power and torque higher, while, due to the turbocharger boost increasing for high revs, we can raise more in the lower and middle rpm range, and for revs above 5000 rpm we should act carefully. If raising the boost (higher CORR) has no effect - then restore the smaller parameters that still gave a gain in power and torque..*

A chassis dynamometer (https://vtechdyno.eu) is useful, but even road measurements can be effective. Measure performance gains and observe if there is visible progress. If there is not - go back to the last parameters at which progress was visible.

⚠ Always remember that PowerBox does not have the ability to modify as many parameters as a well-executed chiptuning. PowerBox is at most a Stage1 tuning. Increments above 20% are possible, but can be dangerous for the turbocharger.

Additional enrichment of the mixture:

- If you decide that the fuel dose is insufficient for the moment of turbine start, then move the data in MULTI%_2 to the right, so that there is one more zero from the left. This will increase the difference between the boost pressure sensor in channel 1 (pinned in the intake manifold) and the pressure in front of the throttle (sensor 2) when the turbo starts (spool). A dose correction map based on the airflow resulting from the pressure difference between 1 and 2 will increase the fuel dose.
- If you want to further increase the fuel dose in any rpm range, reduce the MULTI%_2 value for that range by, say, 10%. Monitor the mixture composition with a broadband probe to avoid over-enrichment in this rpm range.

⚠ We advise that for higher RPMs (6000 and above) the CORR values should be lowered so that at the RPM cutoff the CORR value is zero. This reduces the risk that the required boost pressure will not be reached and the car will report an error.

9. Stage 1 - diesel (based on the original ECU map in WinOls)

In the case of diesel engines, torque is proportional to the fuel dose over a wide load range, as long as enough fuel is provided to burn it.
In a diesel engine, the PowerBox Digital is connected (in addition to the RPM sensor) to a fuel pressure sensor (which allows the fuel dose to be increased), and to a boost pressure sensor (which allows the amount of air needed for combustion to be adjusted).

📝 *Fuel pressure is controlled by the first map block, while boost pressure is controlled by the second. This is due to the design of the wiring.*

🧑🎓 For those interested in how information flows in the ECU of a diesel engine, and how to find the main maps in EDC17, EDC16 and MD1, I recommend my short lesson (30 min, English, with exercises):
https://www.udemy.com/course/chiptuning-of-diesel-engines-in-winols-basics
We also offer professional training courses:
https://vtech.pl/oferta/szkolenia/szkolenia-dla-profesjonalistow.html

📝 *Since we use an increase in fuel delivery (and thus a proportional increase in torque and power) to increase the fuel pressure, we must realize that while we can set virtually any value with the PowerBox on the injection pump, exceeding the maximum pressure predicted by the manufacturer (usually Bosch) by more than 10% will negatively affect the life of that pump. Therefore, to be safe, we will assume that we will not exceed the maximum pump pressure by half of this tolerance - that is, 5%. As* *you will quickly see, we can achieve significant torque and power gains without violating this safety rule.*

Diesel cars are far more similar than gasoline cars. There is less fantasy in engine design and in the materials used.

It's best to raise the fuel pressure in any range (except in the area of unstable turbocharger operation when accelerated) and outside the area of maximum pressures set by the pump manufacturer (where a 5% increase in pressure should not be exceeded - for example, for a pump from an EDC17 with a maximum pressure (for high revs) of 1800 bar should not exceed 1890-1900 bar. That's reasonable.

🧑‍🎓To a large extent, Bernoulli's law approximates the effects of increasing dosage by raising pressure and their consequences. The fuel in a diesel engine is liquid and the increase in injected mass is approximately the square root of the increase in fuel pressure. This means that doubling the pressure gives slightly less than 50% of the dose increase (the square root of 2 is about 1.41...). At the same time, the opening time of the injector, driven by fuel pressure, is almost proportional to the square of the pressure, and it is added (opening time) to the injection time map (duration). To a considerable extent, this linearizes the dose, and it can be assumed (with some understatement) that the increase in fuel pressure generated by the PowerBox will correspond linearly to an increase in torque and thus power.

Of course, the results should be verified on a dynamometer.

As an example of modification, we will use a VW Tiguan 2.0 TDI 170hp, 2012, with Bosch EDC17CP14 controller number 03L997016M.
We raise the fuel pressure (and therefore the power and torque) by 15%, but do not exceed 1900 bar (serial 1800 bar, an increase of just over 5%. To build the characteristics, we raise the fuel pressure from 1750 rpm, the highest value can be 1900 bar (used "Round/limit values).

📝 *Since engine load (Load) is expressed in milligrams of fuel dose per single duty cycle, it has been converted and presented here as a percentage of load for ease of reasoning, assuming that 70 mg/suw is 100% load.*

Fuel pressure percentage change and actual values are below:

-(-,-)/-

Load / rpm	0	1	8	15	23	27	31	35	38	46	54	62	69	77	85	100
500	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
800	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
1000	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
1250	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
1500	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
1750	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	15,0	15,0	15,0	15,0	15,0
2000	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	15,0	15,0	15,0	15,0	15,0
2250	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	15,0	15,0	15,0	15,0	15,0
2500	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	15,0	15,0	15,0	15,0	15,0
2750	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	15,0	15,0	15,0	15,0	15,0
3000	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	15,0	15,0	15,0	15,0	15,0
3500	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	15,0	15,0	11,8	11,8	11,8
4000	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	15,0	14,6	5,6	5,6	5,6
4500	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	13,5	5,6	5,6	5,6	5,6
4800	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	5,6	5,6	5,6	5,6	5,6
5500	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

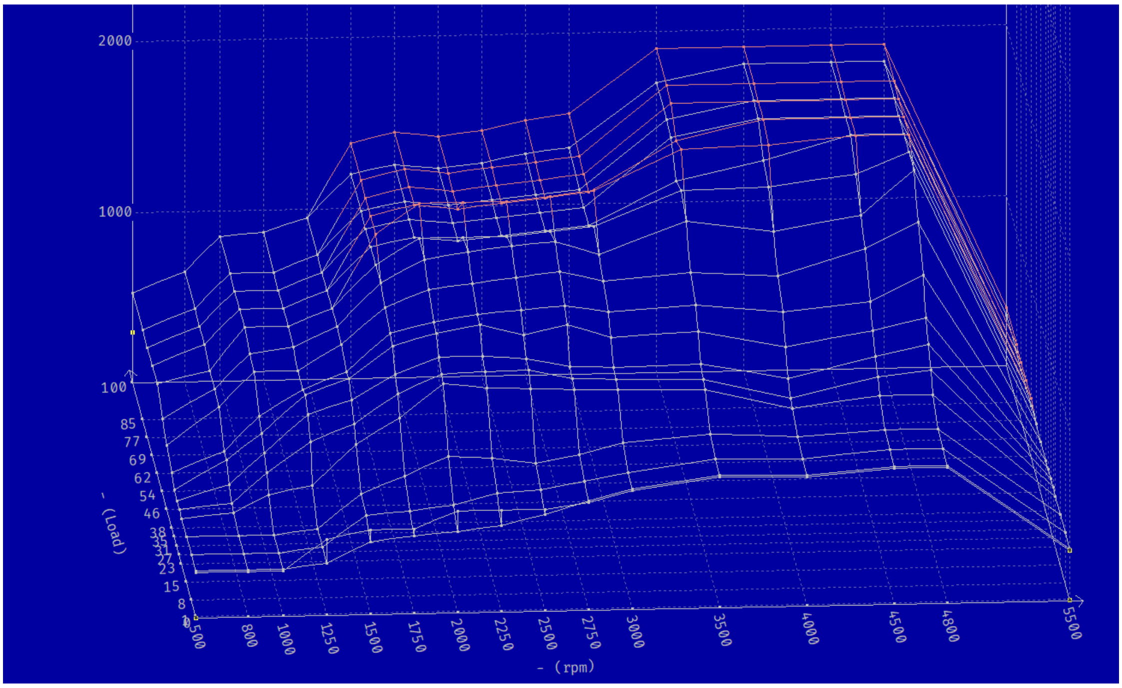
-(-,-)/-

Load / rpm	0	1	8	15	23	27	31	35	38	46	54	62	69	77	85	100
500	270	270	270	270	270	270	270	280	330	380	430	530	530	530	530	530
800	270	270	270	270	300	300	360	450	450	600	600	600	650	650	650	650
1000	270	270	270	270	400	475	540	600	650	800	800	850	850	850	850	850
1250	450	300	300	300	450	650	760	820	800	800	832	850	850	850	850	870
1500	500	420	480	500	685	750	840	910	900	950	950	950	950	950	950	950
1750	500	450	500	600	835	920	985	1095	1120	1160	1200	1380	1380	1380	1380	1380
2000	600	470	530	710	1030	1030	1080	1162	1180	1260	1330	1552	1438	1438	1438	1438
2250	600	500	595	695	1000	1040	1079	1206	1220	1290	1370	1552	1409	1409	1409	1409
2500	600	560	610	656	990	1045	1060	1141	1240	1320	1400	1552	1438	1438	1438	1438
2750	633	633	653	703	980	990	1010	1197	1260	1350	1420	1581	1466	1466	1466	1495
3000	700	700	700	766	973	980	998	1120	1220	1290	1340	1610	1495	1495	1495	1530
3500	770	770	770	810	965	970	1010	1144	1250	1330	1525	1840	1782	1900	1900	1900
4000	760	760	760	784	845	851	914	1045	1200	1300	1453	1852	1900	1900	1900	1900
4500	800	800	805	813	908	963	1035	1127	1251	1450	1541	1900	1900	1900	1900	1900
4800	800	800	805	813	908	1000	1100	1200	1400	1600	1800	1900	1900	1900	1900	1900
5500	300	300	300	300	300	300	300	300	300	300	300	345	345	345	345	345

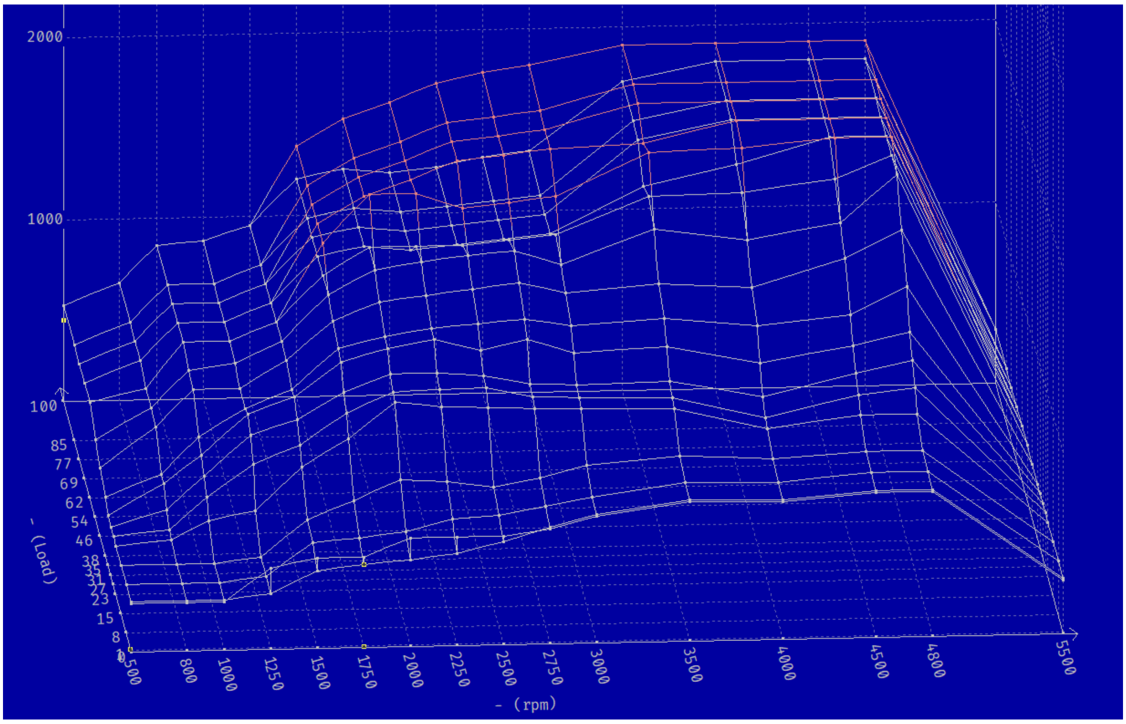
As you can see, up to 3000 rpm we can operate with a 15% increase in torque and power without risking injection pump fatigue. It is likely that the new maximum power will move from an area closer to 4000 rpm to around 3000 rpm. This is good for driving comfort.

Remember that a car accelerates with torque, and horsepower only tells us about the maximum speed possible. High-powered passenger cars usually have a lot of torque, however a jet aircraft has a huge amount of power, but relatively little thrust (the equivalent of torque in a car). Ships, on the other hand, have huge torque with relatively low power.

Taking a closer look at the 3D chart of the fuel pressure map, we discover that the area from 2000 rpm to 3000 rpm contains no increase in pressure as a function of RPM. It looks as follows:



It is nonsensical to lower the fuel pressure as the rpm increases. In view of this, without tiring the pump, we can propose such a characteristic in which the pressure for high loads is much higher than the factory pressure, with a limit of about 5% of the maximum excess of the largest factory value (1800 bar):



This means the following percentage increases in fuel pressure (still not violating the rule that the maximum pressure must not be exceeded by more than about 5% of the maximum factory value):

-(-,-)/-

Load / rpm	0	1	8	15	23	27	31	35	38	46	54	62	69	77	85	100
500	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
800	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
1000	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
1250	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
1500	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
1750	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	15,0	15,0	15,0	15,0	15,0
2000	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	21,3	21,8	21,8	21,8	21,8
2250	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	21,3	31,3	31,3	31,3	31,3
2500	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	15,0	36,6	36,6	36,6	36,6
2750	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	15,0	36,2	36,2	36,2	35,8
3000	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	15,0	35,8	35,8	35,8	35,3
3500	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	15,0	15,0	11,8	11,8	11,8
4000	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	15,0	14,6	5,6	5,6	5,6
4500	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	13,5	5,6	5,6	5,6	5,6
4800	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	5,6	5,6	5,6	5,6	5,6
5500	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

As you can see, we can afford very serious torque gains in PowerBox, in excess of 30% gains over factory. Of course, it is not as good in every car, but being able to freely create maps in PowerBox, we can support ourselves with maps in WinOls.

📝*V-tech Tuning is preparing **OptiTuner** software, which will allow automatic processing of your chips from WinOls into programs (maps) for PowerBox Digital. This will be the world's first solution combining the advantages of chiptuning and an external PowerBox. More coming soon here:*
[*https://www.facebook.com/OptiTuner*](https://www.facebook.com/OptiTuner)

So let's convert our above concept into a progam for a 2.0 TDI 170hp to PowerBox Digital. We will start with maximum gains of 15%. Further changes can be carried out on the dynamometer, knowing what the pump limits are in this EDC17 (and this is explained above, based on the analysis of the program from the ECU in WinOls).

While the dose increments will be set easily based on the map from WinOls, the pressure increments may require calculations, or trial and error checks to see if the car smokes. However, it can be noted that small boost pressure increments in EURO5 and EURO6 guarantee clean engine operation and total absence of smoke. Raising the boost by a few percent (-100 mV to - 200 mV) is sufficient and there is nothing to go crazy about. In a diesel, power does not come from air boost pressure, but from fuel, and it is enough to burn it efficiently and without smoke.

🧒🎓However, it can be predicted mathematically. For EURO5, the maximum mixture enrichment is 19:1 (for EURO6 it is 19.5 :1, EURO4 is 18:1). Each 7% increase in dose is -1 AFR - this is directly derived from dividing the stoichiometric dose for diesel, which is about 1/14.8, which is almost 7%.
We are adding +15% fuel, which corresponds to just over -2 AFR. So our mixture composition at the critical moment will not be richer than 19.0 - 2 = 17.0:1.
The smoke limit in a diesel depends mainly on the fuel, not on the engine design itself. Those for 20 years are already very similar and differ at most in efficiency, not in combustion quality. This limit is 16.5 :1. Hence it follows that we could not raise the supercharging at all, and the engine would continue to burn fuel efficiently. But we

will set the supercharging 3.5% higher than serial, which will give us a mixture that is +0.5 AFR poorer, so it will be 17.5 :1 in the worst situation (for high revs and full throttle).

The supercharging is controlled on the same principle as in a gasoline car. The maximum factory boost of this engine is 2550 mbar (1.55 bar of boost) - vide the cutout of the "boost" map from this car. Raising it by 3.5% will give us 2640 bar maximum (0.09 bar increase), which is no problem for the turbocharger. To get this, we will lower the value measured on the sensor by 3.5% as well (this is a good approximation of the needed change). From the voltage measurement in mV in logging, we will get about 3650 mV for 2.5 bar (the Bosch sensor is a version adapted to higher pressures, 3 bar, hence the readings will be different from the gasoline version of the 1.2 TSI). We will lower the readings by 3.5%, which corresponds to setting the CORR on the pressure sensor channel to **-126 mV**. We calculated this as 3650 mV * 3.5% = 126.

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2190	2270	2350	2350	2350
2350	2425	2500	2510	2510
2400	2450	2500	2520	2520
2400	2450	2500	2530	2530
2400	2450	2500	2540	2540
2400	2450	2510	2550	2550
2400	2450	2520	2550	2550
2400	2450	2530	2550	2550
2390	2450	2530	2550	2550
2370	2420	2430	2475	2500
2050	2050	2050	2050	2050
1750	1750	1750	1750	1750

Changes in boost pressure must be synchronous (at the same time there must be an increase in the dose of fuel, as well as air to burn it). We modify the fuel pressure from 62% of the load. Hence, when the boost pressure (based on the car's original map) reaches the value saved for 62% of the load, we should respond by raising the MULTI % adjustment for both fuel and air boost from zero. However, the MULTI% setting will not be identical for the two channels, because they are two different parameters - dose and boost. What unites them, however, is the fact that for 62% (approximately) of the load, fuel dose and boost pressure should be increased simultaneously.
So we will look at the boost pressure in our TDI:

Boost *

-(Load,-)/-

rpm \ %	0,0	9,2	12,3	15,4	18,5	23,1	30,8	38,5	46,2	53,8	61,5	69,2	76,9	84,6	92,3	100,0
1000	1000	1000	1025	1100	1100	1150	1225	1250	1250	1275	1315	1400	1425	1450	1450	1450
1250	1000	1050	1090	1250	1250	1250	1300	1365	1440	1475	1560	1590	1600	1650	1700	1700
1500	1050	1100	1200	1350	1350	1350	1425	1500	1600	1645	1715	1795	1850	1900	1900	1900
1750	1050	1200	1250	1450	1450	1460	1595	1670	1775	1855	1900	2050	2075	2175	2200	2400
2000	1050	1250	1300	1500	1500	1530	1660	1770	1880	1960	2055	2200	2225	2250	2375	2500
2250	1100	1250	1350	1500	1500	1560	1685	1820	1920	1990	2125	2200	2250	2250	2375	2500
2500	1100	1250	1350	1500	1500	1580	1700	1830	1930	2000	2165	2200	2250	2250	2375	2500
2750	1100	1250	1380	1450	1500	1580	1700	1830	1940	2025	2160	2200	2250	2250	2375	2500
3000	1100	1300	1365	1450	1500	1600	1715	1850	1950	2025	2150	2200	2250	2250	2375	2500
3250	1100	1300	1350	1450	1500	1650	1750	1850	1950	2050	2150	2200	2250	2250	2375	2500
3500	1100	1240	1300	1450	1550	1750	1800	1900	1950	2050	2150	2225	2275	2300	2450	2550
3750	1150	1200	1250	1400	1650	1850	1850	1950	2000	2050	2150	2250	2300	2350	2500	2550
4000	1150	1200	1200	1300	1600	1800	1800	1900	1950	2050	2150	2250	2300	2400	2500	2550
4250	1150	1200	1200	1250	1500	1700	1750	1850	1900	2025	2125	2250	2300	2400	2500	2525
5000	1200	1200	1200	1250	1400	1500	1550	1750	1850	1950	2000	2100	2150	2200	2300	2400

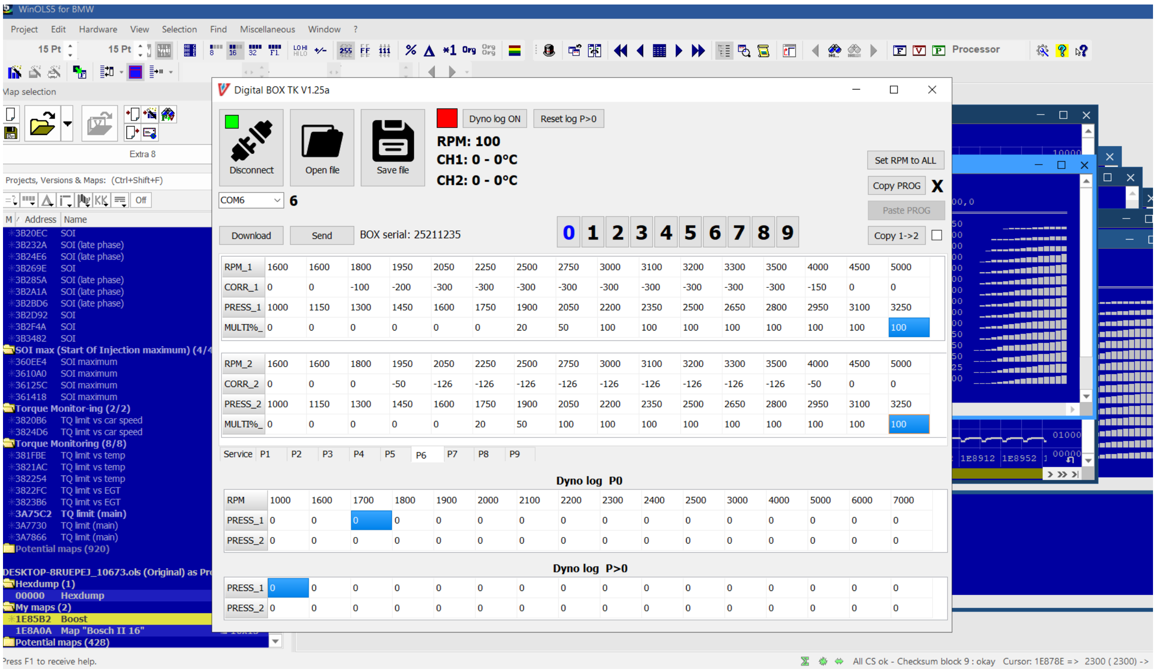
Text 2d 3d

Marked in gray is the area where the load is higher than 62%, and the rpm is 2000 rpm, or higher. This is the area where chiptuning would increase boost pressure by 3.5% (for EURO5 and 6, while for EURO4 you need min. 7% more boost to burn all the fuel). This means that when the air pressure exceeds 2000 mbar, the map should be active (the marked area starts at 2055 mbar). In view of this, MULTI% for air boost pressure should reach 100% for 2055 mbar. This is exactly what we will do.

Based on the data from the original car file, analyzed in WinOls, we can prepare a draft map that meets the assumptions of full mixture afterburning.

> ⚠ We recommend that for higher RPMs (4000 and above) the CORR values should be lowered, so that at cutoff the value of both CORRs is zero. This reduces the risk that the required fuel dose and boost pressure will be unachievable and the car will report an error.

Our end result, assuming dose (and therefore torque and power) gains of up to 15%, and air boost of up to 3.5% for full load from 2000 mbar of factory boost, is as follows:



10. Stage 1 gasoline - in a nutshell

- Download the program for PowerBox from Vtech.co.uk: Simple_Tuning_Gasoline.bin and save it to the PowerBox.
- We edit the program 1 (select with the tab below the maps).
- We measure power and torque on the dynamometer.
- If the performance gain appears too late, we set larger MULTI% values on the left, for both channels.
- If the performance is too low in some range - we raise CORR for both channels. The suggested step is -40 (we subtract 40 from the existing values in the whole maps).
- ⚠We recommend that for higher RPMs (6000 and above) the CORR values should be lowered so that at the RPM cutoff the CORR value is zero. This reduces the risk that the required boost pressure will not be reached and the car will report an error.

📝 *We modify only the first channel, and copy the second channel from the first by pressing **Copy 1->2**. To avoid errors in the ECU, the channels should be identical*

11. Stage 1 diesel - in a nutshell

- Download the PowerBox program from Vtech.co.uk: Simple_Tuning_Diesel.bin and save it to the PowerBox
- We edit the program 1 (select with the tab below the maps).
- We measure power and torque on the dynamometer.
- If the performance gain appears too late, we set larger MULTI% values on the left, for both channels (you can try each one separately - we will then find out which one "holds us back").
- If the performance is too low in some range - we raise CORR_1 for the first channel. The suggested step is -40 (we subtract 40 from the existing values in CORR_1).
- If there is even slight smoke - we raise CORR_2 for the second channel. The proposed step is -20 (we subtract 40 from the existing values in CORR_2).
- ⚠ We recommend that for higher RPMs (4000 and above) the CORR values should be lowered, so that at cutoff the value of both CORRs is zero. This reduces the risk that the required fuel dose and boost pressure will be unattainable and the car will report an error.

⚠ *We do not use **Copy 1->2**. Channel 1 is fuel, channel 2 is boost pressure.*

12. What changes produce what results - in a nutshell

Gasoline:
Increasing CORR_1 and CORR_2 at the same time (increasing negative numbers), same values in both (use **Copy 1->2**) => increase in boost pressure, increase in torque and power.
Setting up MULTI%_1 and MULTI%_2 to rising beforehand, greater-than-zero values => more rapid response to gas.
Milder build-up for MULTI% => calmer boost pressure, reduction of boost peak.
Slight reduction of MULTI% below 100% in the second map => enrichment of the mixture in this rpm range
.

Diesel:
Increasing CORR_1 => increasing fuel delivery, increasing torque and power.
Setting MULTI%_1 to rising beforehand, greater than zero values => more rapid response to gas.
Milder build-up for MULTI%_1 => calmer torque lift, torque peak reduction.
Milder build-up for MULTI%_2 => calmer boost pressure, reduction of boost peak.

13. Troubleshooting

13.1 When the device is connected, available communication port does not appear, or there are many of them

If you are using Windows 7, or older - you may need drivers. Contact us.
If you see multiple COM ports, try to connect to each one. If you see that the box has connected - it will connect on that particular port in the future.

13.2 For high rpm, the car reports failure mode

Either CORR_1 (diesel) or both CORR (gasoline) corrections are probably too high for this rpm. Reduce the correction (i.e., for example, instead of -300 give -250) for these RPMs and above.

13.3 The turbocharger overloads and the car reports a failure mode, or the characteristics on the dynamometer include a torque peak around 2000 rpm

Lower the settings of both CORR for 2000 (or rpm where the torque peak occurs).

13.4 After taking the foot off the gas, the car continued as if it wanted to accelerate.

MULTI% settings are raised above 0 too soon. Try "moving" the start of MULTI% one box to the right (so that there is one "0" more in the map). Repeat until the problem disappears.

13.5 I don't know how to convert PowerBox from engine A to engine B

You need the cable for engine B, and you need to connect to the box and upload the characteristics to engine B. If cable A fits B, it does not necessarily mean that the pins in the cable are connected the same way. Consult us. Uploading the " pre-made" is described in Chapter 2. You will download the finished program from the download section after logging into the dealer service: https://vtechtuning.pl

13.6 I prefer to edit PowerBox maps in WinOls

The guide for working with WinOls and PowerBox is another document from the Read BOX section. Sample mappacks in the form of *.kp (WinOls EVC format) or *.csv (universal format, accepted by WinOls by "dropping" on the project) are in the "downloads" section. The mappack is universal and fits any *.bin program from PowerBox.

13.7. I have a chiptuning ready. I want to process the chip made in WinOls into maps for PowerBox

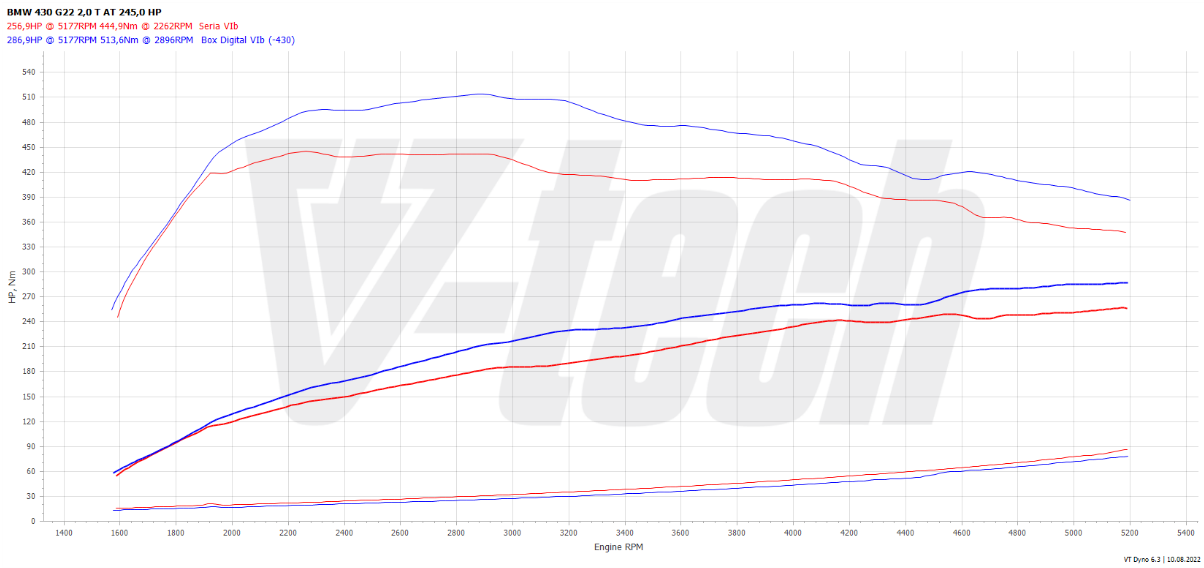
Use OptiTuner software. Soon in the "downloads" section, after logging in after logging in to the dealer service: https://vtechtuning.pl

13.8 Gasoline car reports error (probably - too poor mixture)

Move the data in MULTI%_2 to the right, so that there is one more zero from the left. This will increase the difference between the boost pressure sensor in channel 1 (connected to the intake manifold) and the pressure before the throttle (sensor 2). A dose correction map based on the airflow resulting from the difference between pressures 1 and 2 will increase the fuel dose.

13.9 I don't know how to put the PowerBox Digital into a particular car.

Instructions and videos are in the "downloads" section after logging into the dealer site: https://vtechtuning.pl. You can also contact support@vtech.pl
Example of installation in a BMW 430i (G26) 180kW: https://youtu.be/t6cqtHI3udo
Result:



13.10 I'm not convinced that it works similarly to chiptuning

Let's be transparent. Check out the catalog of our solutions. There you can find real measurements from the dynamometer of our chips and PowerBoxes. Find the car you are interested in and compare the performance on the chip and on the PowerBox Digital.
Link: https://sklep.vtech.pl