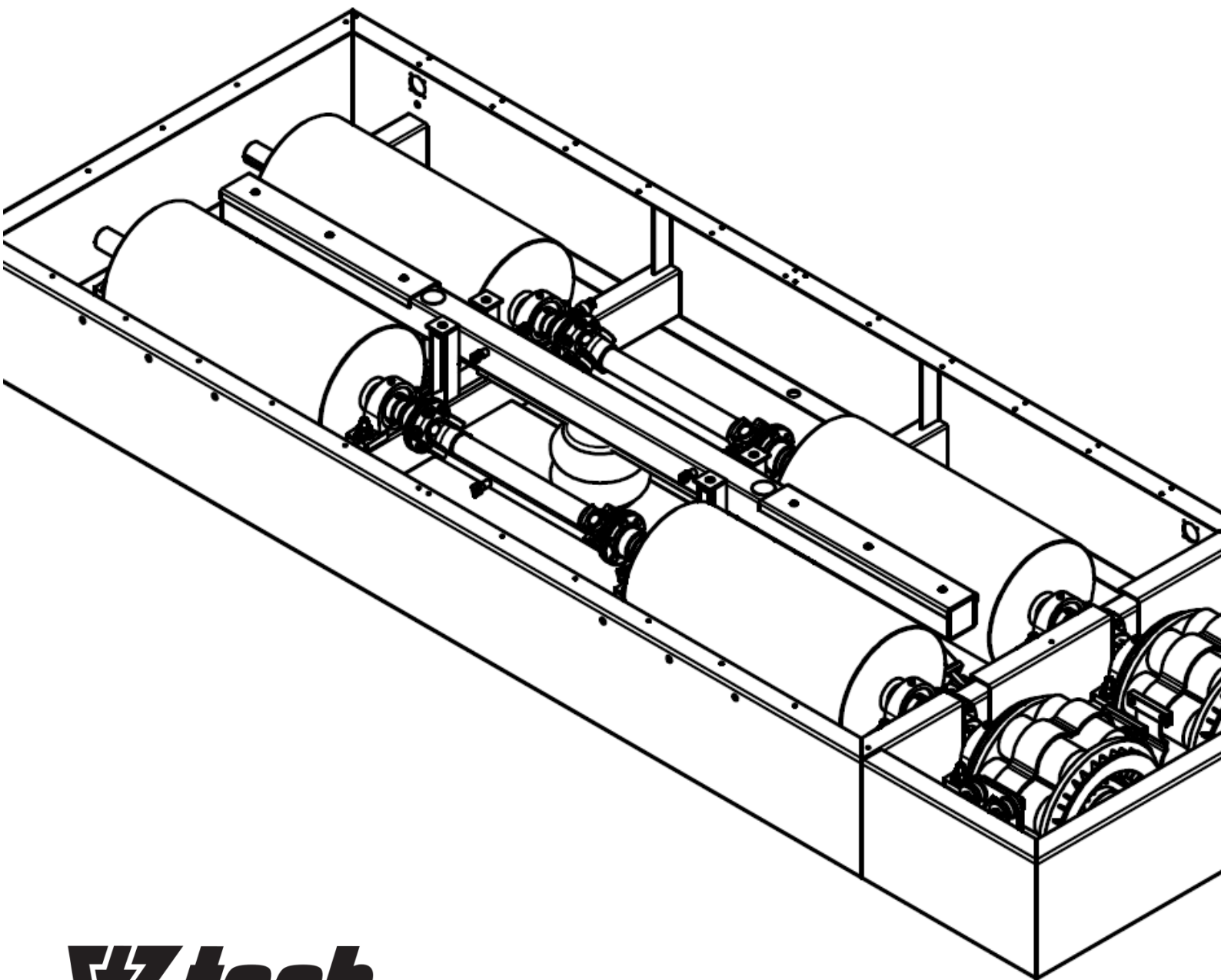


USER MANUAL

INSTRUKCJA



V-tech

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1. General Information

1.1. Dyno

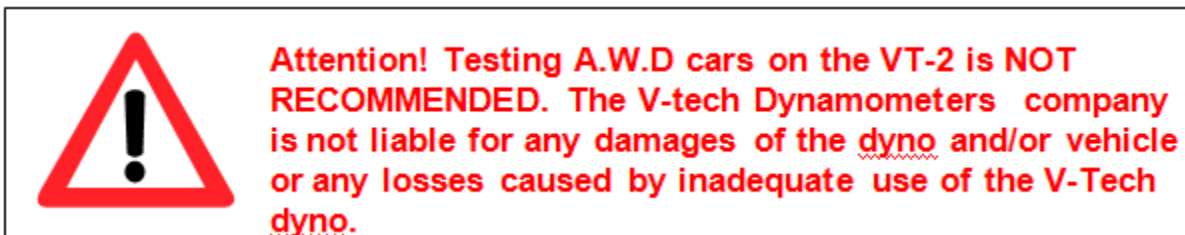
1.1.1. The V-tech Dynos Types

The V-tech Dynamometers enterprise manufactures eight dyno types:

- - **VT-1** - for motorcycles, portable version
- - **VT-2** – single axle inertial
- - **VT-2/B1** - single axle with a eddy current brake,
- - **VT-2/B2** - single axle with two eddy current brakes,
- - **VT-4** – double axles inertial
- **VT-4/B2** – double axles with two eddy current brakes
- - **VT-4/B4** – double axles with four eddy current brakes
- - **VT-2/T** - for trucks and buses

One should note that on single axle or double axles dyno also motorcycles can be tested, more details in Motorcycle Fastening.

The **VT-2(,,)** dyno is intended to test front wheels or rear wheels powered cars.



The **VT-4, VT-4/B2, VT-4/B4** dyno – has been designed and constructed for both one- and two-axis powered vehicles.


1.1.2. Dynos with eddy current break.

The eddy current brakes from TELMA, mounted for the customer order, appear in one version: 800Nm. They can be installed in VT-2 or VT-4 dyno. (Truck dyno is equipped with two KLOFT retarders - 3.300Nm each)

Considering their capabilities, eddy current brakes are used, among others, for road simulations (e.g. air resistance simulations and/or slopes with a possibility to set the slope up to 45 deg.) and for engine tuning (possibility of constant rpm maintenance thanks to the use of automatic regulators applying the load to the vehicle, eg. during the tuning of LPG/CNG powered engines). More in eddy current brakes point in further part of the Manual.


1.2. Maximum admissible load for the V-tech dynos

For the dynos maximum admissible values are*:

	<i>Speed</i>
	<u>$V_{max} = 300 \text{ km/h}$</u>
	<i>On axle load</i>
	<u>$\text{Kg}_{/axle} = 3000 \text{ kg}$</u>

* Limits in VT-2/T: $V_{max} = 250 \text{ km/h}$, On axle load = 15.000 kg/axle

1.3. Work safety Turing work with the V-tech dyno

	Attention! Information contained in this point is essential for health and life of the staff taking part in the measurements. One ought to carefully observe all after mentioned safety rules. Not complying to these rules can lead to health damage or even to death.
---	--



- **Noise level**

Functioning of the dyno and the vehicle can produce a noise of intensity up to 120 dB during the tests.

The staff should have individual equipment for ear protection (soundproof headset recommended)



- **Ventilator / combustion gases exhaust**

In view of high combustion gases emission and of the closed room, **THE USE OF COMBUSTION GASES EXHAUSTOR IS IMPERATIVE.**

Failing to comply with this requirement can result in serious poisoning by CO, CO₂, nitrates, fuel exhalations and others, that can lead to health damage or even to death.



- **Non-authorized persons**

Non-authorized persons are not allowed in the room where the dyno is installed during any tests.

Only the staff trained in the service of the dyno can be present in the room.



- **Hot objects – the engine**

During test measurements the vehicle engine heats, as during usual drive, up to temperatures 90-100°C. The lack of normal cooling of the engine can result in block heating to temperatures higher than 100°C. The use of industrial high-power ventilators is required for the purpose of vehicle cooling. At the opening of the motor hood one should especially mind hot objects.

DO NOT TOUCH HOT OBJECTS WITHOUT PROTECTION



- **Fire extinguisher**

It is required in the works hop.



Group	Fire type	Extinguishing means
A	solids, mainly of organic origin (paper, coal, wood, also plastics)	water, foam, CO ₂ extinguishing powder,
B	flammable liquids and matters that melt (fuel, oil, acetone, melting plastics)	Foam, dry powder, CO ₂
C	Gases (methane, propane)	Extinguishing powder, CO ₂
E	Group A, B, C, D fires close to electrical appliances	Extinguishing powder, CO ₂



- **Pit protection**

After the vehicle fastening (for all the time of the measurement) and when the dyno is not used, the service pit must be protected with covers.

2. Vehicle Fastening

2.1. Driving the vehicle on the dyno rolls

The method recommended applies to both single axle and double axles dynos.

1. Check up the dyno.
2. Make sure whether the lifting beam is in upper position.
For this purpose, check if the pneumatic valve is in the “open” position.
3. In the case of double axles dyno pre-set the position of the dyno mobile axle.

Remember: no one can be then in the range of mobile part move.

4. Drive the tested vehicle slowly on the dyno rolls. The wheels should be in the middle of roll base.

Before the beginning of vehicle centring remember to close the pneumatic valve and make sure that the lifting beam is in the bottom position.

In the case of double axles dyno before the centring operation the dyno mobile axle should be set in suitable position ensuring adequate adherence of the wheels to the rolls.

5. Protect the vehicle against falling out from the rolls during the test.

Remember that vehicle fastening can be performed only when the rolls are completely stopped and the engine is not running.

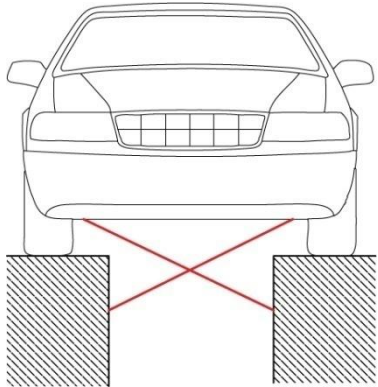
6. Connect the required measuring equipment and the exhaust-pipe taking the combustion gases from the vehicle exhaust pipe to the exhauster.

After leaving the pit cover it with protection boards.

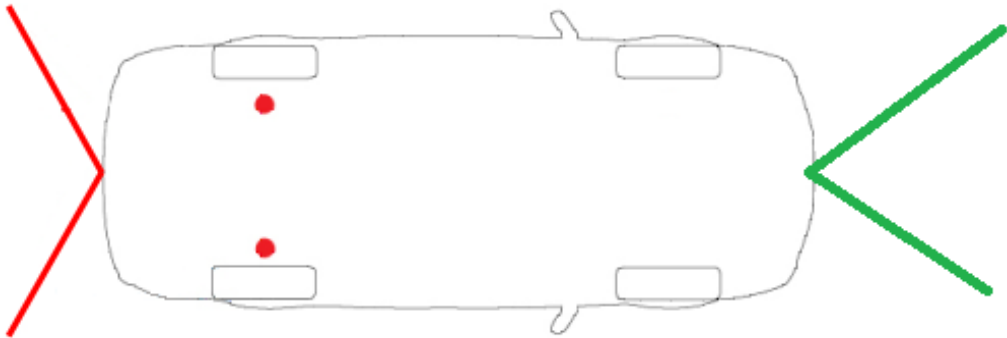
7. Before starting the test, all persons should leave the dyno room, with exception of the staff taking part in the measurement.

8. Turn on external light sign informing about the test in progress and turn on the exhauster recon ducting the combustion gases out of the dyno room.

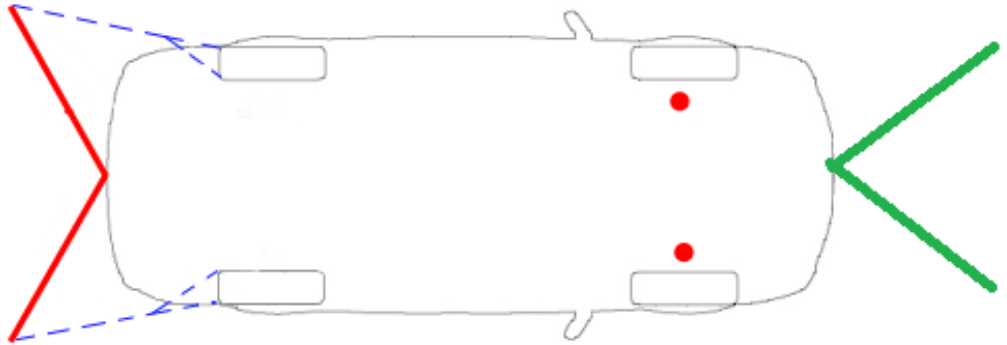
3.2 Fastening of one-axle powered vehicle



Fastening method



Rear wheel driver vehicle



Front Wheel driver vehicle

Fixing points:

Red line and **red points** mark fixing points and the method of proper fastening of the vehicle to the foundation by the means of anchor ties, belts and ratchet tighteners.

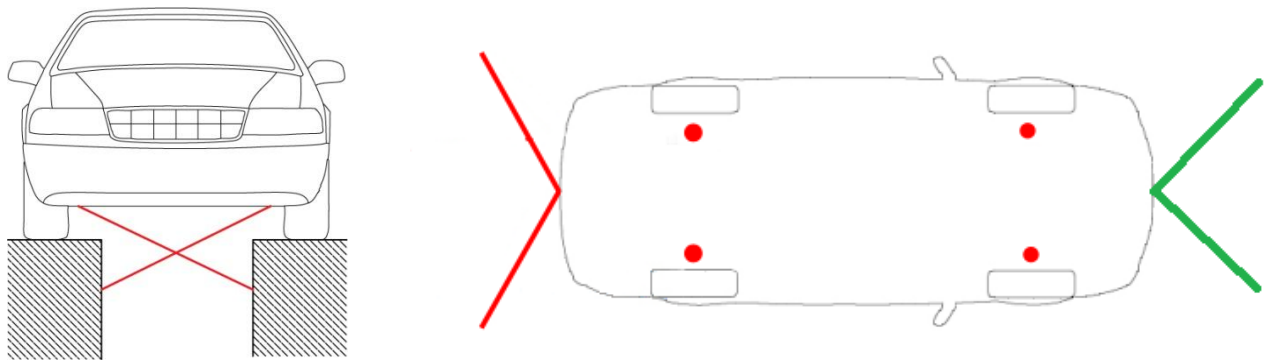
Dotted **blue line** – another possible method of vehicle fastening (anchoring).

Green line – additional fixing point for better stability of the vehicle.

The belt cannot be damaged in any area. It should be tightened in order to prevent vehicle movement on rolls during the measurement.

Too strong belt tightening can lead to the increase of power loss during tests.

2.2. Fastening of two-axle driver vehicle



Red line and **red points** mark fixing points and the method of proper fastening of the vehicle to the foundation by the means of anchor ties, belts and ratchet tighteners.


Dotted **blue line** – another possible method of vehicle fastening (anchoring).

Green line – additional fixing point for better stability of the vehicle.

3. Room ventilation and combustion gases exhaust

The room ventilation is essential for the health and the life of staff working on tests. It is important also for proper measurements. Too high temperature or varying values of temperature between subsequent tests can lead to differences in the behaviour of vehicle control unit.

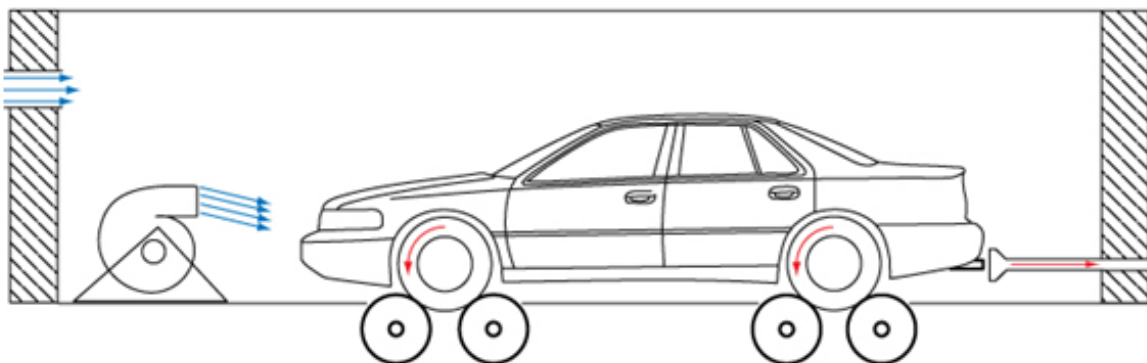
Certainly, one can choose adequate norms in the program to properly recalculate temperature and pressure values, nonetheless the room temperature should be maintained at the level about 25°C for all measurements.



Combustion gases exhaust
In view of high combustion gases emission and of the closed room, THE USE OF COMBUSTION GASES EXHAUSTOR IS IMPERATIVE. Failing to comply with this requirement can result in serious poisoning by CO, CO₂, nitrates, fuel exhalations and others, that can lead to health damage or even to death.



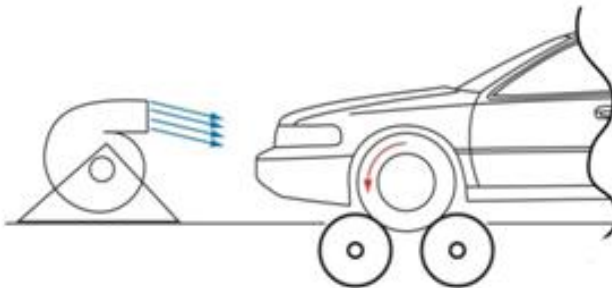
Room airing is recommended after every measurement on the dyno.



4. Vehicle cooling during dyno measurements

For the purpose of vehicle engine cooling during the tests the use of industrial high-power ventilators is required. The lack of cooling in closed room can lead to incapacity of vehicle cooling system and in consequence to engine damage.

Recommended ventilators:
WBD-400 5,5kW 20700m³/h



During vehicle measurement, especially during forceful tests with the use of eddy current brake (e.g. road tests, constant RPMs) the temperature indicator should be monitored to prevent the engine overheating.

Vehicles during the measurements are very often accelerated on the dyno up to speeds over 200 km/h; unfortunately stream ventilators produce only about 100 km/h air speed at the output.

Even airflow of 20700 m³/h can be unable to assure cooling equivalent to normal drive cooling at speeds of 200 km/h.

5. DynaVtech Program Launching

Hardware key - The key protects the dyno software from copying and simultaneously acts as the software license. Before starting the dyno software the key must be inserted into an USB port.



Dyno

File

Database 206 123 + Enter Registration

Create Project Data Form

Registration KR23412

Vehicle type Car Motorcycle Other

Gearbox MT AT CVT Other

Model and Brand Displacement [L]

Engine symbol Fuel type

Stock power [HP] Stock torque [Nm]

Client name JAN KOWALSKI Production year

Weight [kg] Frontal area [m2] Cx

Comment

Clear Create

Input status: Off OBD: Off Fan 1 Fan 2 Fan 3 Clutch Lift Pressure: n/a Temp: n/a

1. **Database** - The database allows to store projects indexed by client data and to assign dyno measurements to projects.
2. **Standard** – The list of tests assigned to individual projects included in the database .
3. **Function bar** – strip illustrating the data of the connected modules (measuring card , the interface OBD) . The bar also includes buttons for operation dynamometer (switching fans, clutch , lift).
4. The quick vehicle search in the database.

Dyno

File 1 4 Enter Registration

Database 500 KR23231 +

Type	Brand	Model	Year	Engine Type	Gearbox	Capacity	Power	Torque	Registration	Client	Creation	Comment	...
Car	FIAT	500		Turbo Diesel	MT				KR23231	JAN NOWAK	Yesterday 13:58		X
Car	AUDI	A6 3.0 TDI		Turbo Diesel	MT		225KM		KR23412	JAN KOWALSKI	Yesterday 13:12		X
Car	Peugeot	206		Turbo Diesel	MT	1,4	68KM		123		Yesterday 10:38		X

2

Standard

Star	Name	Max Power	Max Torque	Date / Time	Type	Norm	Shift	Comment	...
★	Test0004 Vb	453,2HP @ 5944RPM	558Nm @ 5468RPM	Yesterday 14:35	LP	No data	80,0		X
★	Box0003 Ivb	458,6HP @ 6158RPM	588Nm @ 4007RPM	Yesterday 14:06	IN	No data	80,0		X
★	Chip0002 Ivb	478,1HP @ 5192RPM	714Nm @ 3305RPM	Yesterday 14:03	IN	No data	97,0		X
★	Test0001 Ivb	478,1HP @ 5192RPM	713Nm @ 3379RPM	Yesterday 14:01	IN	No data	97,0		X

3

Input status: Off OBD: Off Fan 1 Fan 2 Fan 3 Clutch Lift Pressure: n/a Temp: n/a

6. Preparation of the program for measurements

In order to create a new project, click the button: **File / New Project ...**

The Project is described by the following details:

- name (client)
- registration
- the car brand
- type of car
- engine type
- type of drive
- comments

After entering the data click the **Create** button.

The screenshot shows the Dyno software interface. At the top, there's a menu bar with 'File' and 'Project'. Below it, a toolbar contains 'Database', 'A6 3.0 TDI KR23412', '500 KR23231', and 'Enter Registration'. The main window has tabs for 'Standard', 'Constant speed', 'Road test', 'Driving cycles', and 'Project data'. A table with columns 'Show', 'Name', 'Max Power', 'Max Torque', 'Date / Time', 'Type', 'Norm', 'Shift', 'Down cut', 'Up cut', and 'Selected Test Comment' is visible. Below this, another table with columns 'Star', 'Name', 'Max Power', 'Max Torque', 'Date / Time', 'Type', 'Norm', 'Shift', and 'Comment' is shown. At the bottom, there's a status bar with 'Input status: Off', 'OBD: Off', 'Fan 1 Fan 2 Fan 3 Clutch Lift', 'Pressure: n/a', and 'Temp: n/a'.

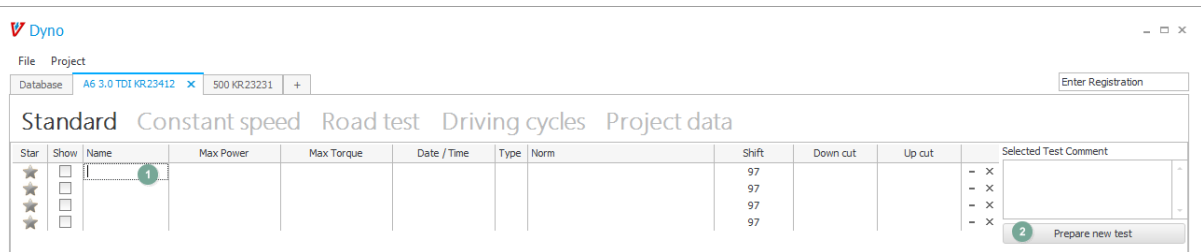
1. **Banks** - The program features special edition fields called banks, where the performed measurements are saved. Also the data from projects performed earlier is stored in banks. The data from banks are stored in computer memory. It can be saved too and loaded from the database. The program gives access to four banks, where four independent measurements in one project can be saved or to each bank an element of another project can be written, with its own identifying data, by import from the database. If all the banks are occupied, the contents of one of them can be cleared by deleting an existing test (after saving it to the database), and in a clear bank next measurement can be made or another measurement can be loaded from the database. Thanks to the option of loading to banks the tests for different vehicles from the database the results can be compared.

Star	Show	Name	Max Power	Max Torque	Date / Time	Type	Norm	Shift	Down cut	Up cut	Selected Test Comment
★	<input checked="" type="checkbox"/>	Test0001	478,1HP @ 5925RPM	625Nm @ 3856RPM	Yesterday 10:46	IN	No data	85	730	5960	- X
★	<input checked="" type="checkbox"/>	Chp0005	478,1HP @ 5246RPM	706Nm @ 3414RPM	Today 12:50	IN		96	640	5280	- X
★	<input type="checkbox"/>							97			- X
★	<input type="checkbox"/>							97			- X

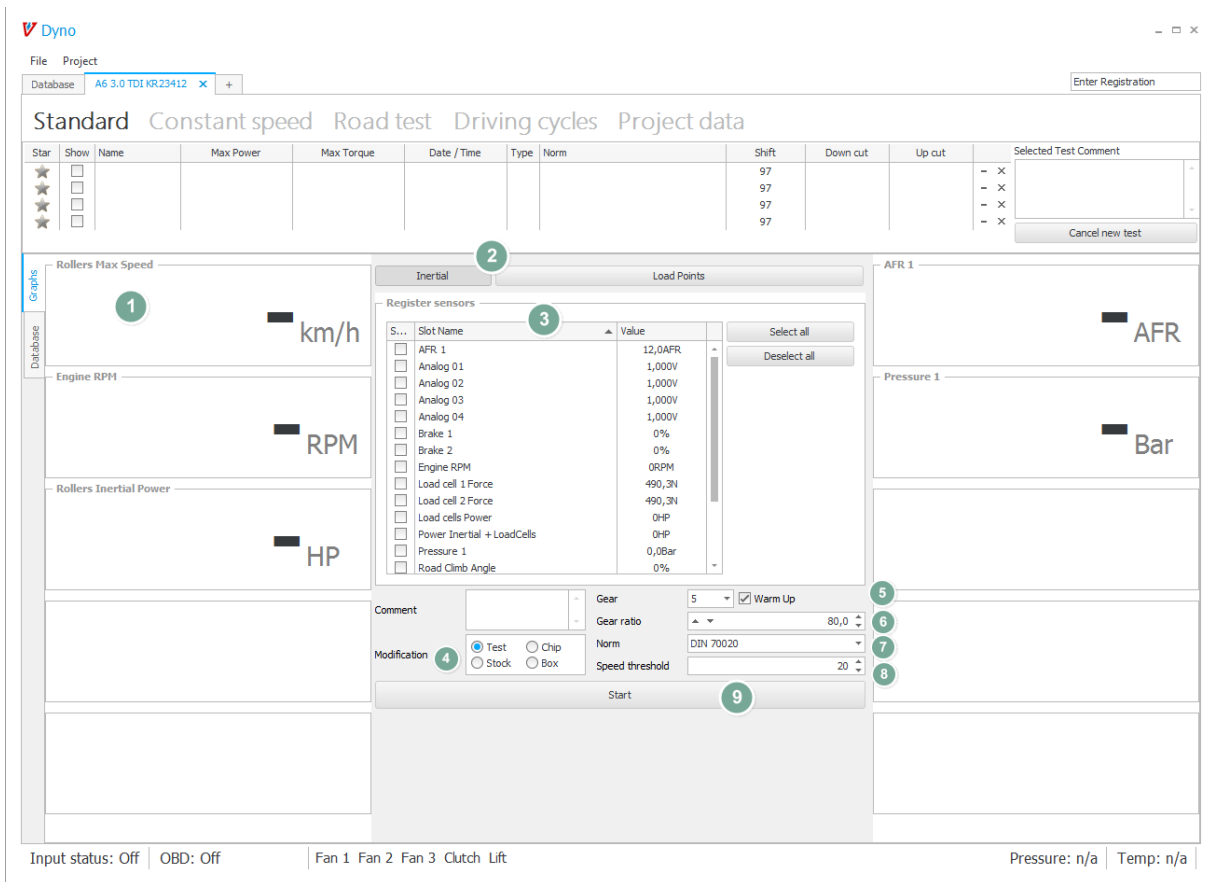
Button (1) allows you to erase a particular measurement from the bank. Button (2) completely erases the specified measurement from the database.

2. **Database** window – If the project you are working with has already been saved to the database, we have the ability to assign previously made measurements to individual banks in the project in

order to compare the measurement contained in the database with the new measurement (eg . The modification of the vehicle) . To do this, click on 2 times our interest test.



In order to prepare the test for the new project , click on the bank where you want to create a new test (1) , then click on the icon **Prepare new test** (2).



The settings window of a new test:

1. **Preview performance** – To add the parameter you wish to view , double-click in the blank rectangle to the left or right side , then click the check box value we want to have a preview (engine rpm, AFR , pressure sensor) .

2. Selecting the measuring mode

Depending on the type dynamometer what we have , we can choose from:

Inertial dyno:

- inertial mode

Load dyno:

- inertial mode
- inertial mode with rpm suspension
- braked mode
- constant rpm mode
- road test mode

The choice depends on what measurement you want to perform :

- inertial measurement - click button **Inertial**,
- load measurement – click button **Load Points**.

3. **Register sensors** window – in this window shows a list of all available sensors. In order to log data from sensors that interest us, during the measurements should tick occurring at a given parameter.

4. **Modification** – the ability to choose to modify the vehicle to a more transparent analysis of the results.

5. Gear selection window. **Warm Up** allows the engine to bring the vehicle to optimum operating temperature. The procedure is activated automatically when you press the Start button (9). After its completion we do not receive any data. After the end of the warm-up (automatic stopping vehicle wheels), program will automatically start measuring test.

The screenshot displays the Dyno software interface. At the top, there is a menu bar with 'File' and 'Project'. Below it, a database selection field shows 'A6 3.0 TDI KR23412'. The main interface is divided into several sections:

- Standard** (selected), **Constant speed**, **Road test**, **Driving cycles**, and **Project data** tabs.
- A table with columns: Star, Show, Name, Max Power, Max Torque, Date / Time, Type, Norm, Shift, Down cut, Up cut, and Selected Test Comment. The 'Shift' column contains the value '97'.
- Rollers Max Speed**: 34 km/h
- Shift Calculator**: Input field '2000', 'Calculate Now' button, 'Get from OBD' button, and output field '80'.
- AFR 1**: 12,0 AFR
- Engine RPM**: 862 RPM
- Pressure 1**: 0,0 Bar
- Rollers Inertial Power**: 7 HP

During the Warm-up mode we can set the gear ratio (see section 6) by a tachometer in the vehicle. To do this, set the engine rpm in **Shift Calculator** window, then align the rotational speed (gear which will be carried out to measure) appears on the vehicle tachometer, and click the **Calculate Now**

button. Before clicking a button, a few seconds to keep aligned speed. On the right side you will see new calculated gear ratio.

6. **Gear ratio** - Gear Ratio depends on the course on which you performed the test , as well as the diameter of the wheel (rim and tire - especially when changing from summer tires to winter and vice versa). It is recommended to perform all the measurements in the same gear and at the same configuration of tires and wheels in order to maintain identical test conditions. If you change gear and / or wheel and tire ratio should be measured again.

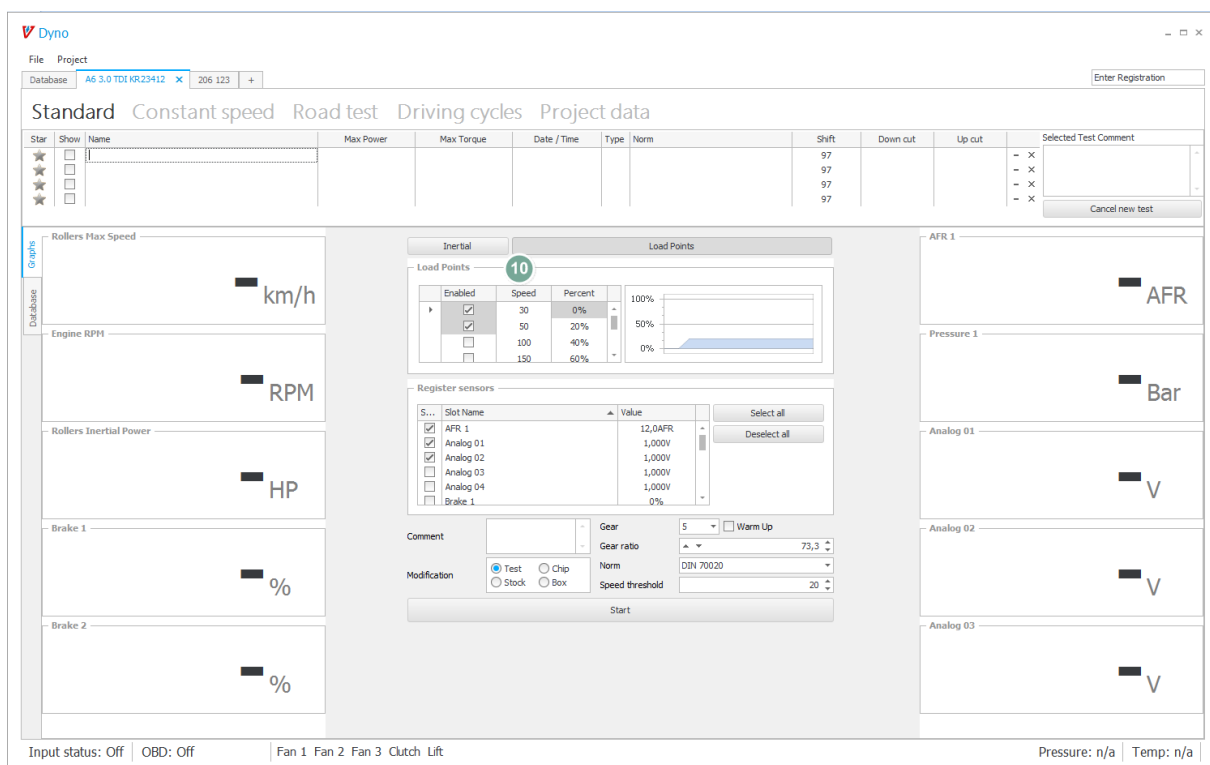
7. **Norm** – The selection list the standards by which the measurement will be carried out . The use of standards for the specific measurement of torque and power takes into account the adjustments resulting from the pressure and the temperature at which the measurement is performed . The program has the possibility of converting the following global standards :

- DIN 70020
- EWG 80/1269
- ISO 1585
- JIS D1001
- SAE J1349

The values of pressure and temperature are taken from sensors located on the control panel . If the sensors are not connected during the test , the selection standards is not possible.

8. Window elections roll speed at which begins and ends the measurement.

9. **Start** – click start button to start the measurement.

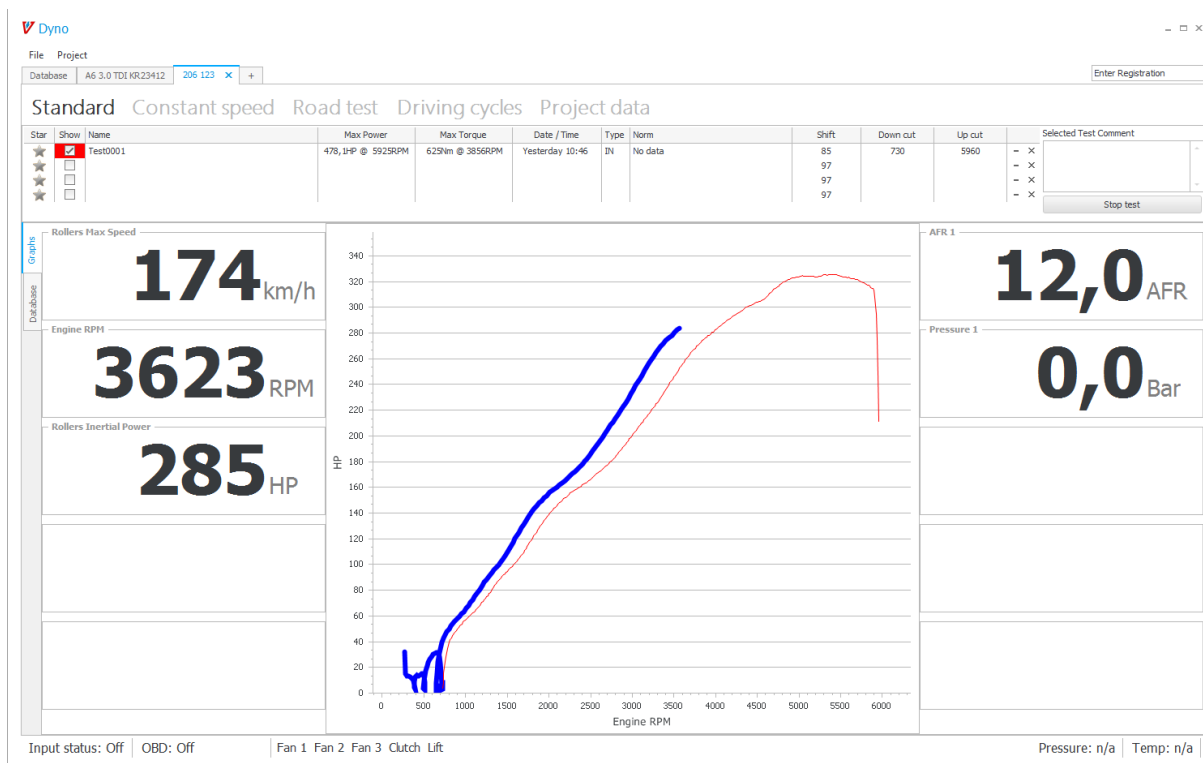


10. **Load mode** - It allows full customization of the load torque generated by the eddy current brake in the entire speed range of the engine.

7. Brake mode selection

7.1. Inertial dyno test

This is the simplest and quickest method of measuring the torque and power of the car to the engine and wheels. Of course, other modes also offer such opportunities, with the exception of the road test and the test solid rotation, which is read only power to the wheels. The car is accelerated on a dynamometer to a user-selected speed, then maneuver Release, the car goes without a drive until it stops. Load for the engine will be to measure the inertial mass of rolls, rolling resistance, and resistance to the drive mechanism. The measurement time is about 10-20 seconds at full load and a few minutes of free rolling on the dyno until it stops. Power and torque are measured as a function of speed the car rolls (power and torque at the wheels) and its release (power and torque losses). Their sum creates a score representing the power and torque of the motor.



To perform the measurement:

1. Select appropriate dyno test mode in the program and press START
2. Speed up the vehicle wheels, changing gears up at relatively low engine RPMs (max. 1000 rpm), up to the gear in with the measurement will be performed.
3. Press the acceleration pedal home, allowing the engine to reach maximum RPMs (gasoline engines usually up to approx. 6500-7000 RPMs, diesel engines usually 4000-4500 RPMs). Press the clutch pedal releasing simultaneously the gas pedal; wait for self-stopping of the vehicle.
4. Once the vehicle's wheels stop , the test is automatically terminated .
5. Chart measure will be shown in the " Graph" .



During the test one may not use the vehicle brakes.
Often check the engine temperature, do not let it overheat.

After the stopping of wheels and rolls the engine should be turned off. Because of increased engine temperature, it is recommended to cool the engine by the means of blowing ventilator during a few minutes after finishing the test.

Room airing is recommended after every dyno measurement, if there is no blow-exhaust ventilation. In the case of combustion gases smell, the room should be immediately aired and the persons present should leave it. If headaches, nausea, dizziness are reported, the doctor should be contacted immediately.

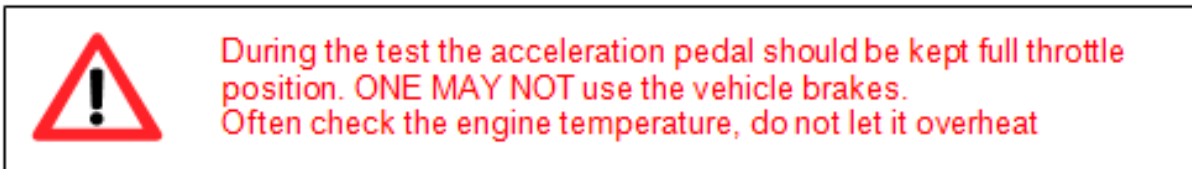
It is not recommended to perform few measurements in turn because of increased temperature of the engine and of the room.

7.2. Dynamic load mode

The measurement is similar to the inertial mode, with the difference that the eddy current brake assembly simulates a higher load. Load indicator is a percentage, referred to in the dynamometer by the user. This mode allows you to extend the measure and correct downforce of the car, which is recommended when measuring, among others, very powerful turbocharged engines.

To perform the measurement:

1. Select the appropriate braking mode in the program. In the load mode test window set values: load brake (expressed as a percentage), the linear velocity of the test vehicle, of which the brake will begin to bill the roller dynamometer and the speed at which the brake load reaches a constant value. After entering all the data, press the START button.
2. Speed up the vehicle wheels, changing gears up at relatively low engine RPMs (max. 1000 rpm), up to the gear in with the measurement will be performed.
3. Press the acceleration pedal home. Brake control system will increase the load by. set pattern. When the motor obtains its maximum RPMs (gasoline engines usually up to approx. 6500-7000 RPMs, diesel engines usually 4000-4500 RPMs). Press the clutch pedal releasing simultaneously the gas pedal; wait for self-stopping of the vehicle.
4. Once the vehicle's wheels stop , the test is automatically terminated .
5. Chart measure will be shown in the " Graph" .



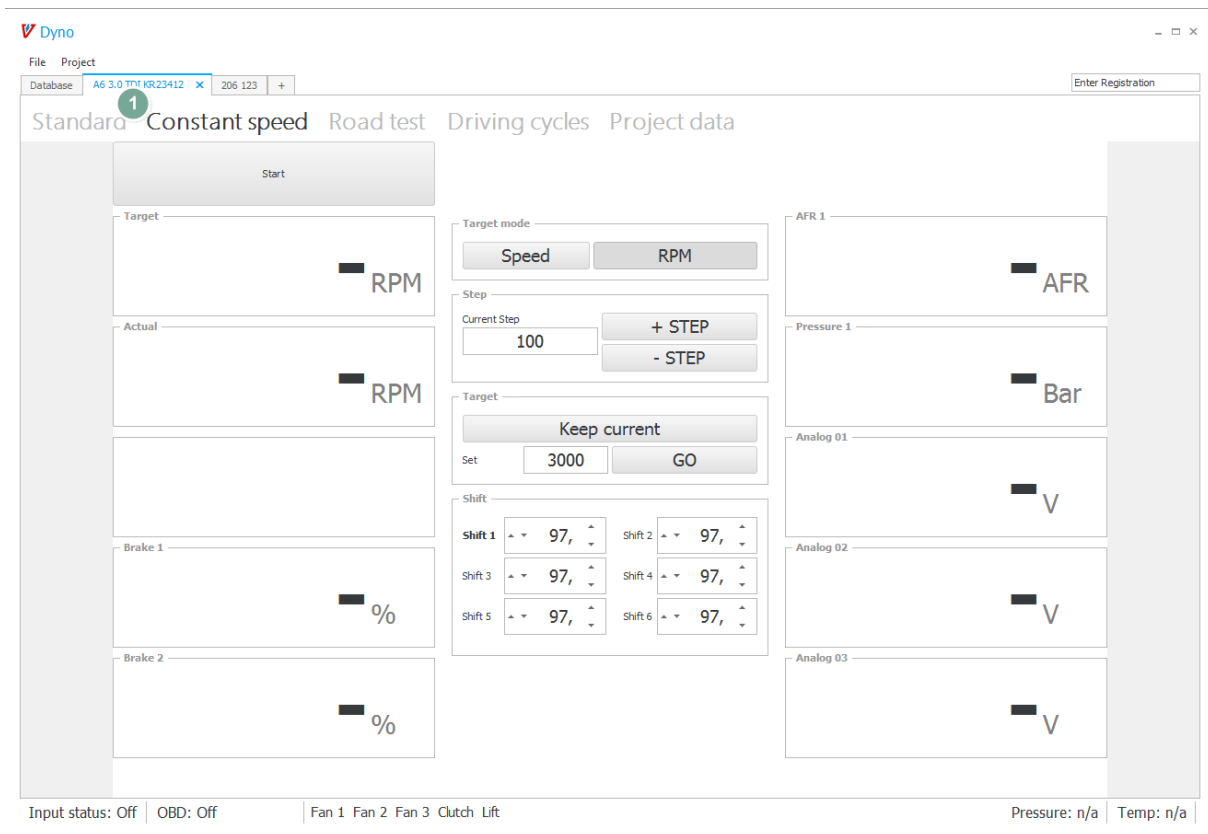
After the stopping of wheels and rolls the engine should be turned off. Because of increased engine temperature, it is recommended to cool the engine by the means of blowing ventilator during a few minutes after finishing the test.

Room airing is recommended after every dyno measurement, if there is no blow-exhaust ventilation. In the case of combustion gases smell, the room should be immediately aired and the persons present should leave it. If headaches, nausea, dizziness are reported, the doctor should be contacted immediately.

It is not recommended to perform few measurements in turn because of increased temperature of the engine and of the room.

7.3. Constant rpm mode

The measurement is based on balancing the driving force of the vehicle on a dynamometer. Measurement time is approx. 10 seconds at full load (for the stabilization of RPMs and read the result) for each measurement point (specifically selected rpm). Power on wheels for each measurement point is calculated based on data from tensometr and displayed in real time on the screen. This function is used most often alignment LPG systems, and to deliver precise engine operating parameters at predetermined rotational speed.



To perform the measurement:

1. Select appropriate dyno test mode in the program (1) and press START
2. Speed up the vehicle wheels, changing gears up at relatively low engine RPMs (max. 1000 rpm), up to the gear in with the measurement will be performed.
3. Press the acceleration pedal home, the computer controlling the brakes will restrain the engine to maintain the rpm rate set earlier at completely pressed gas pedal. The operation described above is also possible to carry out at partial pressing the accelerator pedal (in cars with petrol engines means that tuning in the partial repeal of the throttle - engine operation at medium load).

Buttons:

1. **CHANGE TO** (field 'Target') - It allows you to quickly change the required speed, modifying the GO key.
2. **CHANGE TO** (field 'Current Step') – Enter the value by which to change rotation when you press the +/- button STEP. Confirm by clicking OK. Entered value should appear in the 'Current'.

+STEP - using the button, the speed will be increased by a predetermined amount

-STEP - using the turnover will be reduced by a predetermined amount

Keep current – Tested vehicle RPMs will be maintained at values of speeds that are currently visible in 'Target' window.

In order to set gear ratios refer to Gear Ratio term. You can assign several gear ratios.

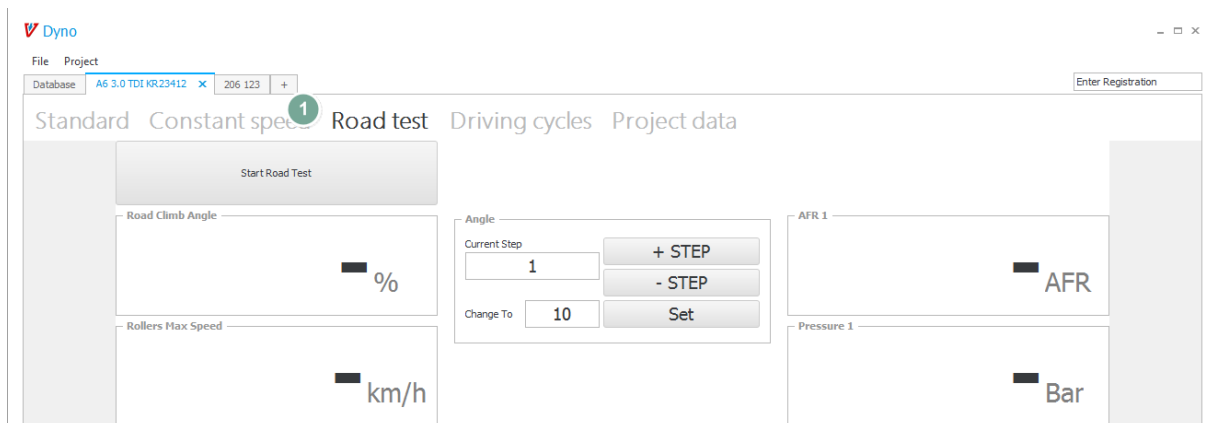
7.4. Road Test

The car accelerates in a similar way to the road conditions. Eddy current brakes, generate a load similar to the forces due to air resistance, and elevations, depending on the actual speed of the car.

To perform the measurement:

1. Select appropriate dyno test mode in the program (1) and press START
2. Drive the vehicle wheel changing gear in a manner similar to the normal road (road simulation).

While driving, the brake control computer will change the engine load in such a way as to simulate driving on a normal road, taking into account the elevation angle and the air resistance.



Buttons:

1. **CHANGE TO** (field 'Road test') - enter the value in degrees, allows you to quickly change to a predetermined angle (max 45 °).
2. **CHANGE TO** (field 'Angle') –
3. Enter the value by which you want to change the angle, after pressing the +/- button STEP. Confirm by clicking the Set button. Entered value should appear in the 'Current'.

+STEP - using the button angle is increased by a predetermined value

-STEP - using the button, the angle will be reduced by a predetermined value

In the 'Vehicle data' window must be supplemented by the following data:: weight [kg], the coefficient of aerodynamic C_x and the cross-sectional face A [m²] (Give the approximate value that

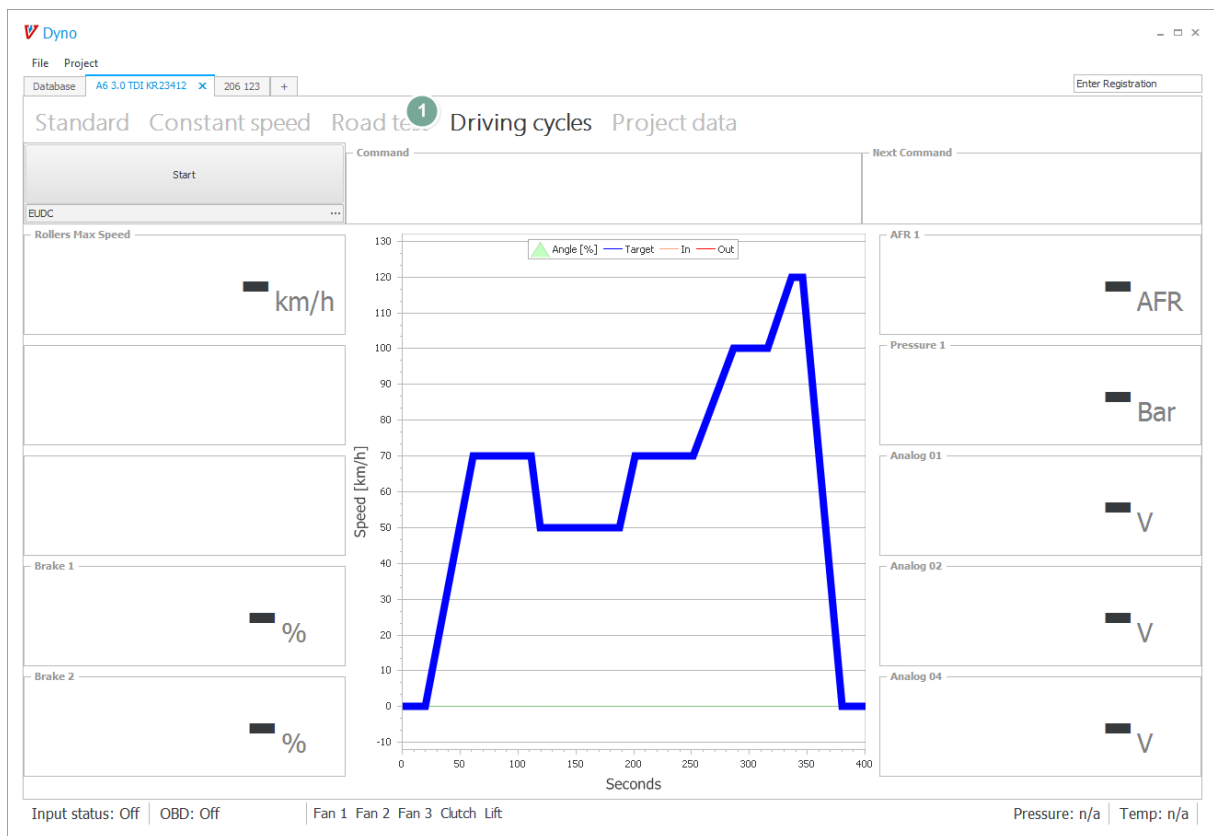
you want to take into account program or the width and height of the vehicle and the utilization rate calculated field values cross-section face, which will be further taken into account by the program (typically 85%).

7.5. Driving Cycles

The ability to perform driving cycles according independently configured schema or selected from the available database (eg. The EUDC test involving simulation of non-urban driving conditions). With the use of driving cycles, among others, in order to study the level of emissions, fuel consumption, etc., or to perform a calibration of LPG / CNG.

To perform the measurement:

1. Select appropriate dyno test mode in the program (1) and press START
2. Follow the on-screen commands in the "command", "next command" windows. The entire measurement is reduced to acceleration, braking and gear changes at specific intervals.



8. Measurement results analysis

8.1. Graph

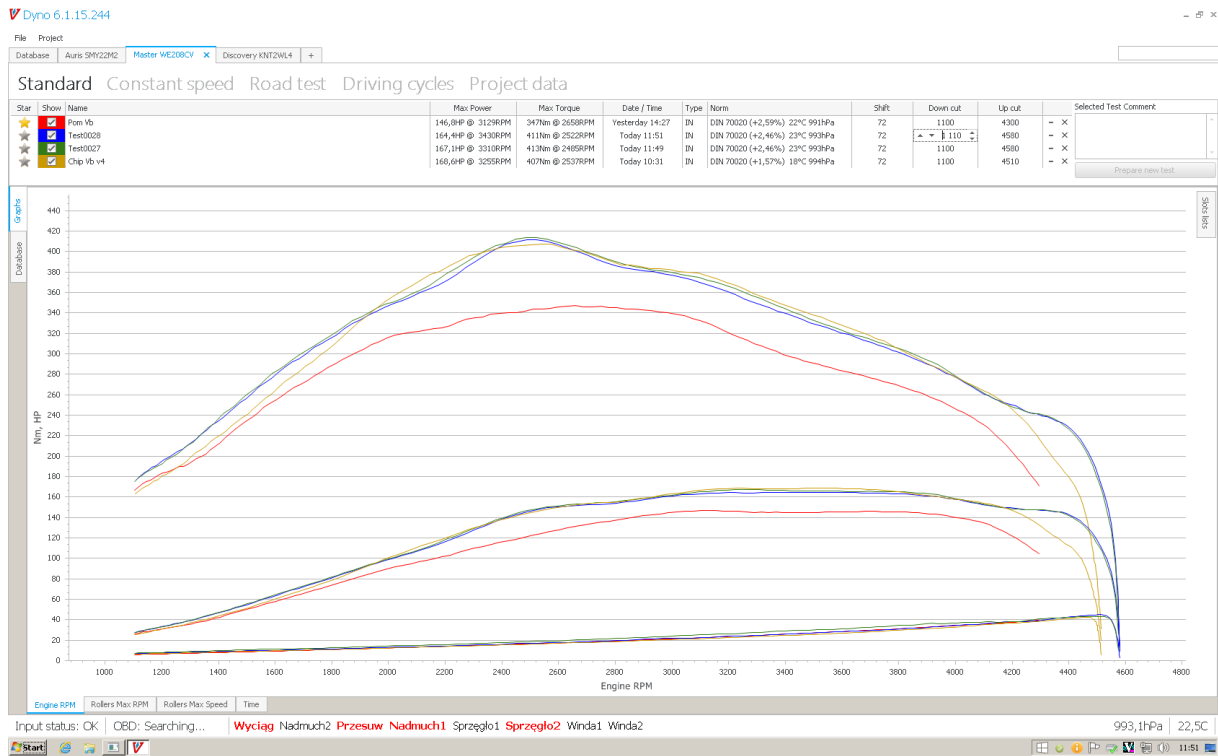


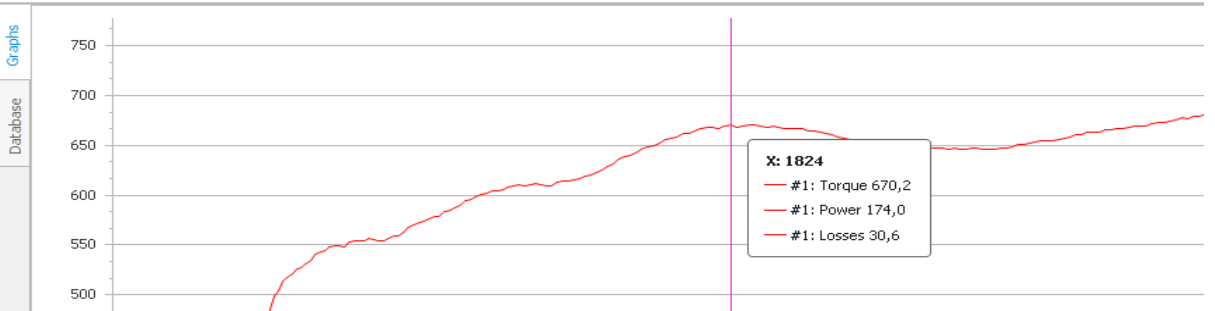
Chart is a very accurate portrayal of the measurement results are shown in the measurement of active banks. Dynamometer V-tech and software that support it provide very accurate information about the test conducted. Within seconds, the program saves up to 3000 samples. Because the chart is created on the basis of such a large amount of data, it is a very accurate portrayal of the measured performance of the engine.

8.2. Tracing

This function makes it possible to trace the reins of power, torque, motor loss, the linear velocity of the vehicle and readings from sensors at certain speeds, anywhere in the chart. The window shows the values resulting from the intersection of the vertical line of conduction (gray lines here), displaying graphs. (Colors: blue and red). The X-axis shows the value of the rotational speed.

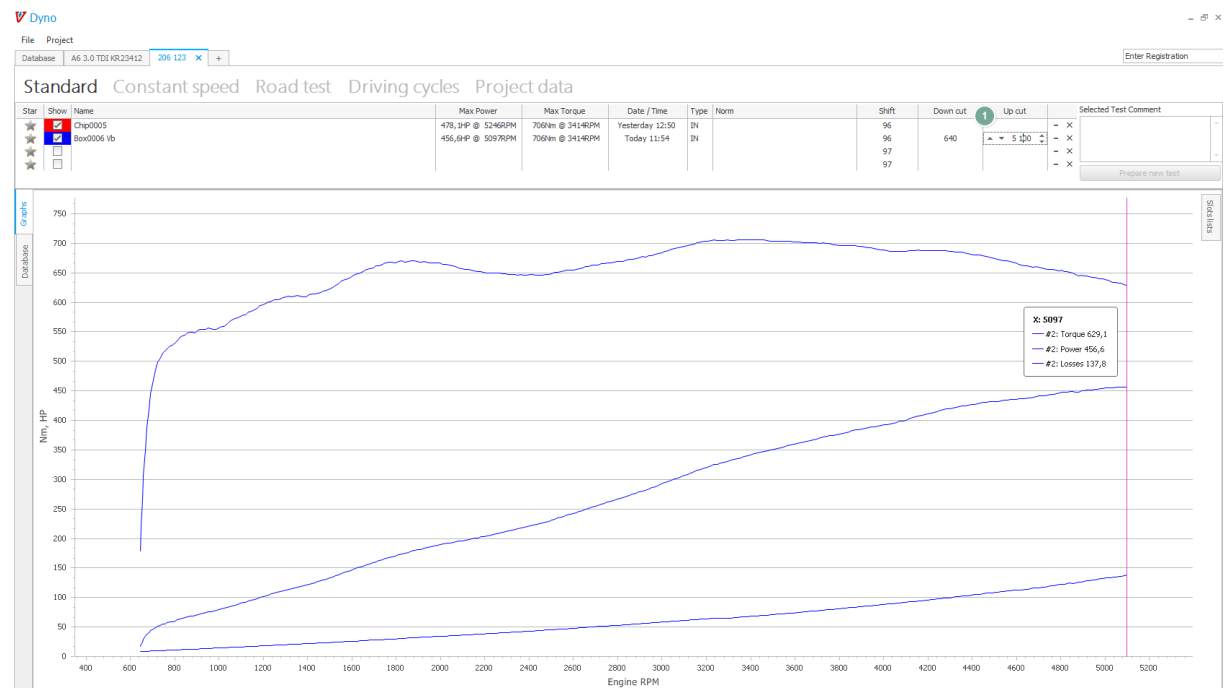
Standard Constant speed Road test Driving cycles Project data

Star	Show	Name	Max Power	Max Torque	Di
★	<input checked="" type="checkbox"/>	Chip0005	478,1HP @ 5246RPM	706Nm @ 3414RPM	Yest
★	<input type="checkbox"/>				
★	<input type="checkbox"/>				
★	<input type="checkbox"/>				



8.3. Cut off

If at the beginning or end of the chart with brake appear unnatural spikes in power and torque resulting from translating gear at too high engine speed or improper clutch, remove them using 'cutting' tool (1).



8.4. Generating graph

In order to generate the graph we have 2 options: Print or export to PNG file. Both functions are available in the **Project** tab.

9. Program configuration

In order to setup tab, go to **File / Settings ...** or press **F5**.

In the settings there are several tabs that allow among others:

- The configuration of sensors connected to a dynamometer or configuration of additional sensors that make it possible to extend the capabilities of the device,
- The ability to exchange units of the measured values and asked in what we want to perform measurements,
- Entering company data which appears on the printout from the chassis dynamometer,
- Joining the company logo in the form of a watermark that appears in the graph,
- Full load control the dynamic brake dynamometer.