

PowerBox V2 Manual

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Made in Norway



What is an intelligent PowerBox and how does it work:

An intelligent PowerBox is a tuning box made for the Renault Twizy, which can increase your Twizy's power (Torque) from 55Nm up to 100Nm. This is an increase of 82%!

In addition to being a tuning box, it also has an OLED display which shows various information. The PowerBox comes with two remote controls.

What can the intelligent PowerBox do?

1. It automatically tunes the car according to the engine temperature (in Auto mode).
2. You can choose between Light tuning, Medium tuning, and Max Power tuning or set it back to the default factory setup.
3. You can choose between Auto mode and Manual mode.
4. You can choose from 3 different driving profiles: ECO, Normal and Sport, even while you are driving.
5. Turn on or off regeneration while driving.
6. You can choose how much regeneration you want in the Regen Setup menu.
7. The display shows real-time RPM, SOC, Engine temperature, Battery temperature, Amp and how much power you use in Nm.
8. The PowerBox also provides additional battery protection by monitoring its temperature.
9. Where the PowerBox V1 had buttons on the device itself, the PowerBox V2 uses a remote control.
10. The PowerBox can show you various detailed status information about the battery.

The PowerBox is a smart tuning box that can tune your Twizy to its maximum in a safe way. In Auto mode, it sets the profile to Sport when the engine temperature is between 0 to 89 degrees. If the engine becomes 90 degrees, it automatically switches to Normal and if the engine reaches 100 degrees it switches down to ECO, which is basically the same mode as an original, un-tuned Twizy uses.

The engine temperature must drop below 80 degrees before it switches back to Normal and it must drop below 70 degrees before it switches back to Sport.

The Twizy engine should be able to withstand temperatures up to 160 degrees, so the PowerBox is keeping your engines temperature well below the maximum range.

In Manual mode, choose between ECO, Normal or Sport by pressing button A, B or C on the remote control. As an added security, the PowerBox will always adjust the profile automatically if the engine gets too warm, just like it does in Auto mode. This is done to prevent your engine from overheating. In Manual mode though, you have to switch up to a higher profile yourself once the engine has cooled down below the temperature limits.

The remote controls

The PowerBox comes with two remote controls. These remote controls are universal control that have a learning function and must be programmed before use. Kenneth will do this for you.

The remote controls have four buttons: A, B, C and D to control the PowerBox.

The remote control button features are:

Button A has three functions:

1. Press the A button shortly to switch to the ECO profile when using the Manual mode.
2. Hold button A for two seconds to switch regeneration on or off
3. Hold button A for four seconds to switch regen reduction on or off. The regen reduction function reduces regeneration when the Twizy battery is too cold. It also limits the amount of power during acceleration. This function is disabled in the Medium or Max Power profile. In this menu you can control it yourself.

Button B has two functions:

1. Press button B shortly to switch to the normal profile when using the Manual mode.
2. Hold button B for two seconds to switch between Auto and Manual Mode

Button C has one function:

1. Press button C shortly to switch to the Sport profile when using the Manual mode.

Button D is the Menu button.

Inside the menu, the D button acts as a Back and Exit button.

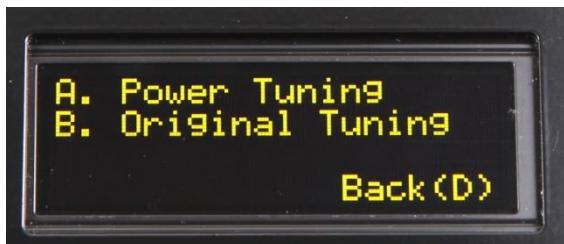
Shortly press the button to go back in the menu. Hold the D button to Exit the menu. The functions of the buttons A, B and C vary in each menu, their function is displayed in the relevant Menu.

Tuning the car for the first time:

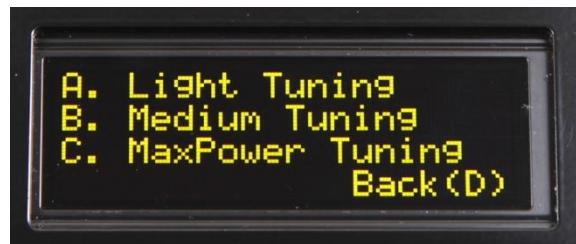
Turn the ignition key to the ON position, then plug the OBD2 connector into diagnostic port which can be found in left glove compartment.

The tuning box will now automatically detect your Twizy and show you the tuning menu.

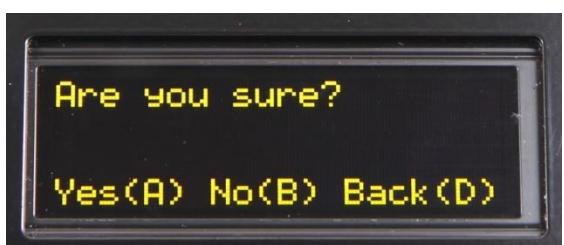
(Sometimes Auto Search does not detect your model, in this case press the D button to enter the menu).



Press the A button to select power tuning



Now select the desired tuning level with the A, B or C button



Select Yes.



The PowerBox will first set the ECU in a preoperational mode. This will take about 10 seconds.



When the Twizy is ready, it will start the tuning process.



Important! When done, turn the ignition key off and on again.
You are now ready to drive.

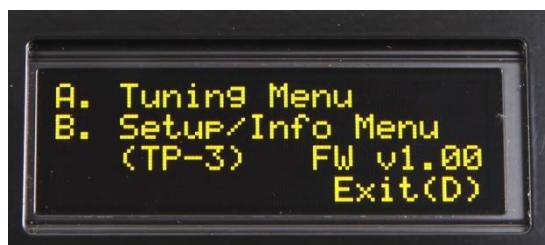
The Manual Mode with the Normal profile is selected by default. Hold the B key (Normal) if you want to switch it to Auto-Mode. If you have chosen maximum power tuning, your home screen will look like this:



Regeneration Menu:

In the Regen menu you can change the parameters for how much regeneration you want during neutral braking and the amount of regeneration when using with the foot brake. Neutral braking means how much the Twizy brakes by using the engine when you release the accelerator pedal.

Press button D to enter the main Menu.



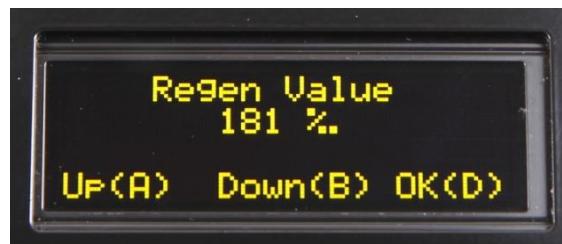
Select B to enter the Setup/Info Menu.



Then select the B button for the Regen Setup.



Then select A for Neutral Breaking.



Here you see the Regen value in per mille. The default value is 181 per mille, which equals 18.1%. Press Up or Down to the desired value and when done press OK. The new value will be saved and the PowerBox will return to the previous menu.

The same procedure can be used for the regeneration of foot breaking.

Press button D to enter the menu.

- B. Setup/Info menu
- B. Regen Setup
- B. FootBraking

Here you see Regen value in per mille, default value is 251 per mille which is the same as 25.1%.

Press Up or Down to the desired value and when done press OK. The new value will be saved and the PowerBox will return to the previous Menu.

Should PowerBox always be connected?

If you have selected Medium or Max Power tuning, it should always be connected. This is because the PowerBox must protect your engine against overheating. In addition, the BMS function should be on to enable the Regen reduction function.

If you have selected Light tuning, you can remove the PowerBox if desired.

If you do not use the car for several days, you should disconnect from the PowerBox or better, disconnect your 12v battery. If not, you risk draining the 12v battery. A 12v battery should never fall below 10.5 volts, because it might damage it.

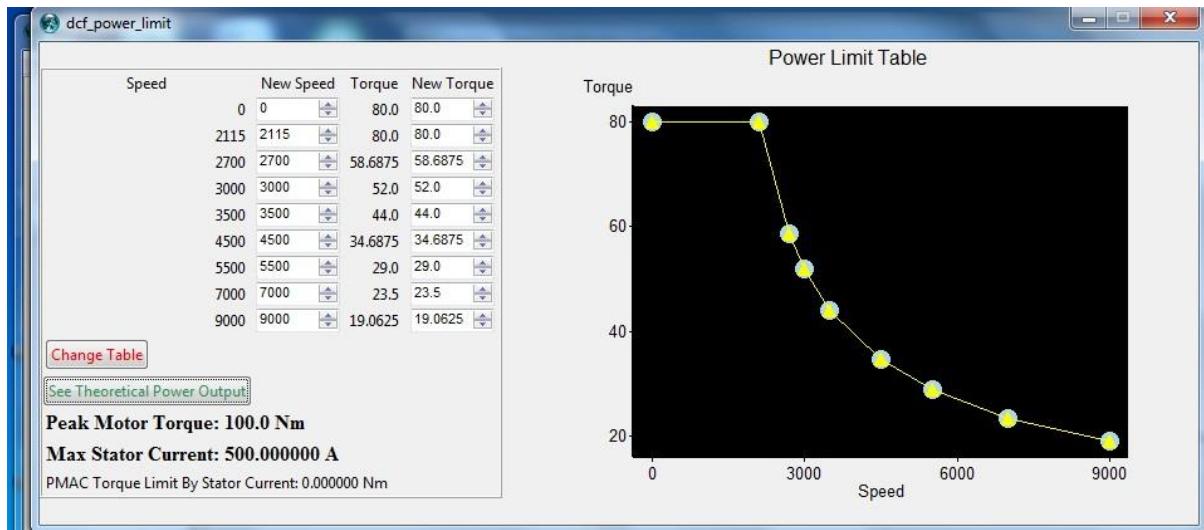
The PowerBox uses approximately 130mAmp in standby which will be about 3.2 amps a day.

So what is the difference between the three tuning options Light, Medium and Max Power tuning?

The biggest difference between the three tuning options is the torque (Nm) from 0-70 km/h. Above 70 km/h they are all the same and they all have a top speed of max 115 km/h. On flat roads, a realistic speed is between 95 to 105km/h depending on the wind force and direction.

Light Tuning Power Map:

In Light tuning mode the maximum torque set to 80Nm.



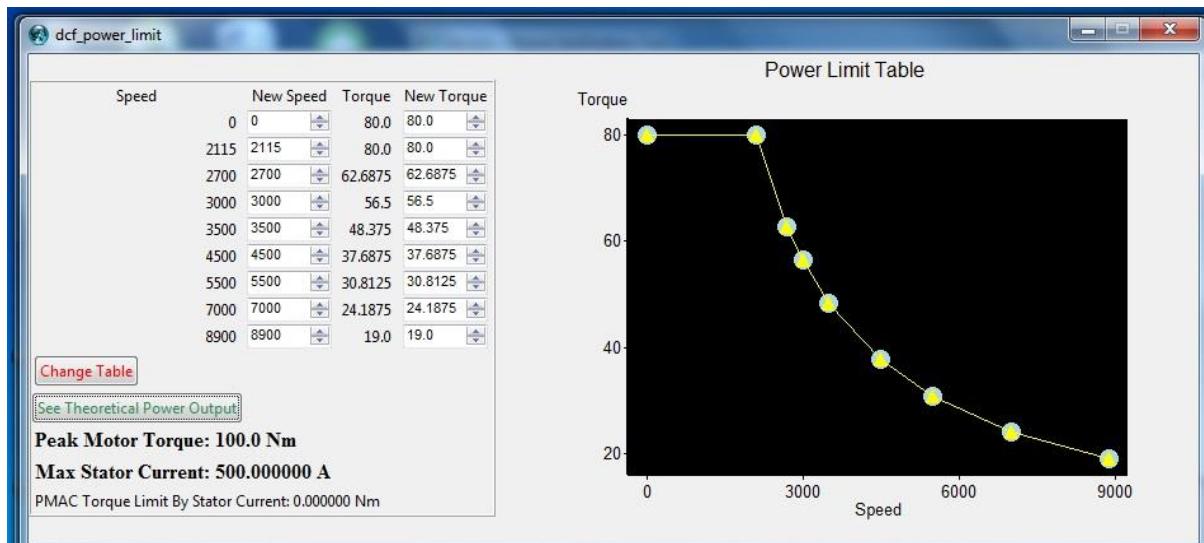
Medium Tuning Power Map:

In Medium tuning mode the maximum torque set to 90Nm.

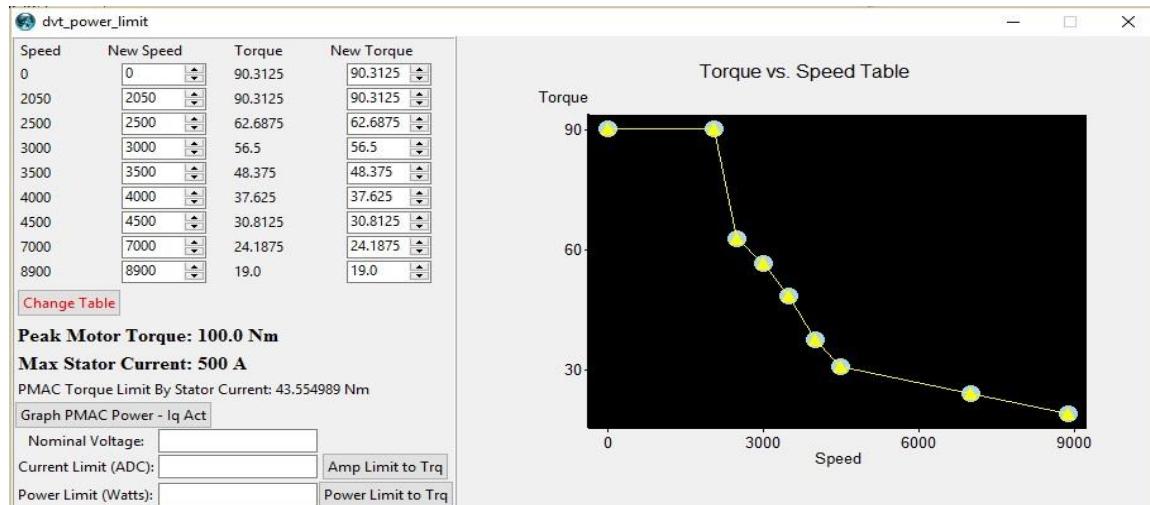
With this setup you may occasionally get a STOP notification on your Twizy screen from the BMS controller included in the battery pack. This will happen when the engine starts to get a little warm, but not dangerously warm.

When the engine temperature rises above 70 degrees, you will be able to draw almost 500 Amp in this tuning mode and because the battery has to deliver more than 450 Amp, it sends out a STOP alert. You can safely ignore this warning.

This graph shows the 80Nm power map in Medium tuning:



This graph shows the 90Nm power map in Medium tuning:

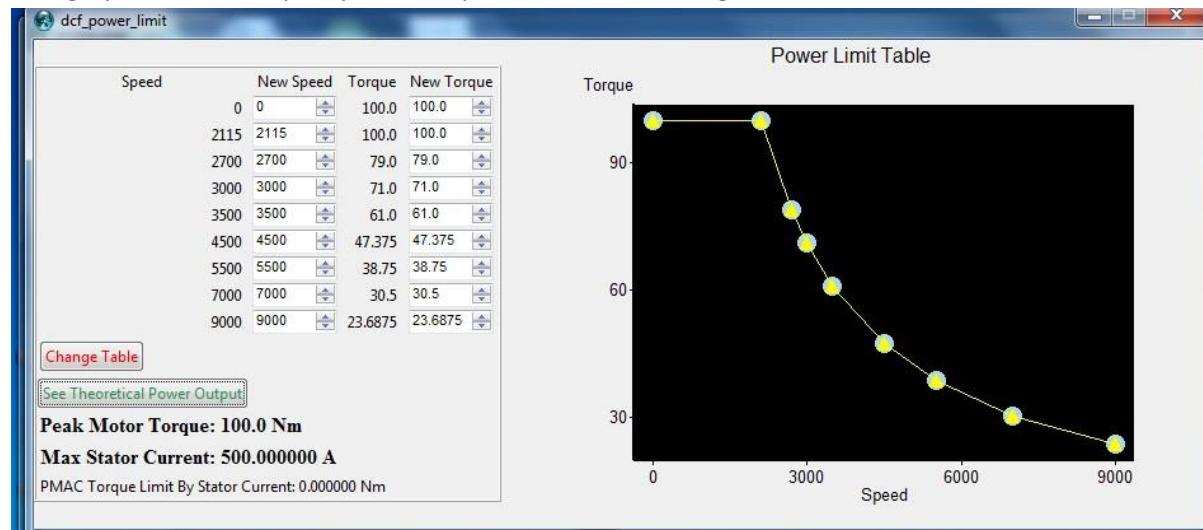


Max Power Tuning Power Map:

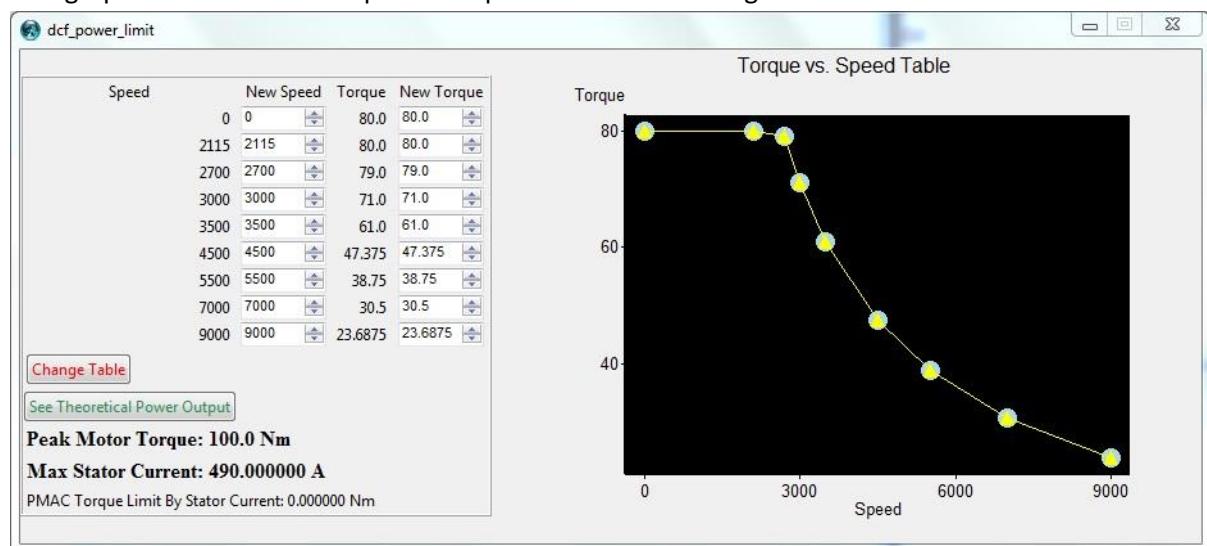
In the Max Power tuning mode the maximum torque is 100Nm, so you will always get a STOP alert when you give full throttle from standstill or low rpm. The Twizy uses all the power it has got and the engine can easily reach 90 degrees. Watch the temperature and drive carefully when it switches down to the Normal profile.

The Normal profile in this tuning mode is more powerful than the one in the Medium and Light mode, so you can easily drive the engine up to 100 degrees, in which case the PowerBox will switch back to the ECO profile.

This graph shows the Sport power map in Max Power tuning.



This graph shows the Normal power map in Max Power Tuning.

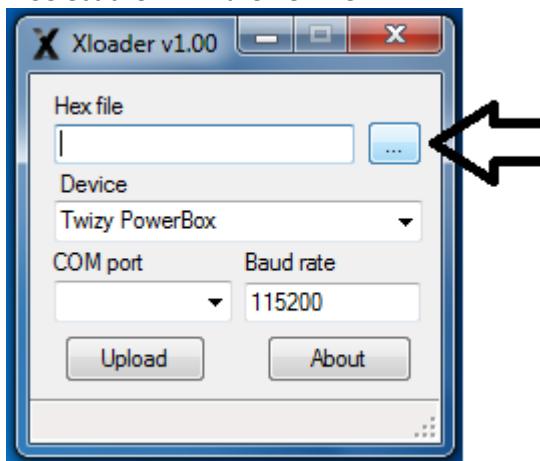


Firmware update:

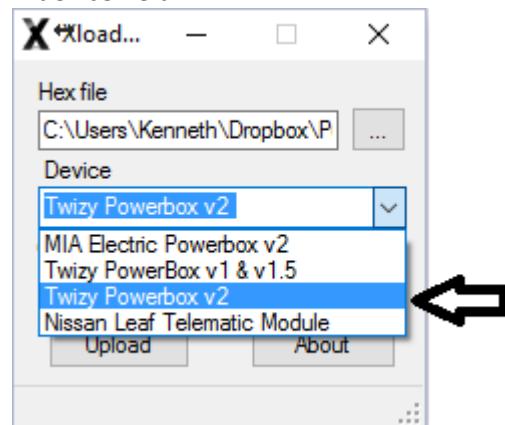
In order to update the PowerBox, you must install the Arduino software that you can download [here](#). Press the Just Download link to start the download. If you have Windows 10, you do not need to install this driver. Windows 10 installs it automatically. You also need to install the XLoader software that you can download [here](#). Before proceeding, you may want to restart your computer.

Afterwards you can connect the PowerBox to your computer with a mini USB cable. Your computer will search and install it automatically and assign it a COM port number. Once the installations completes, start the XLoader application.

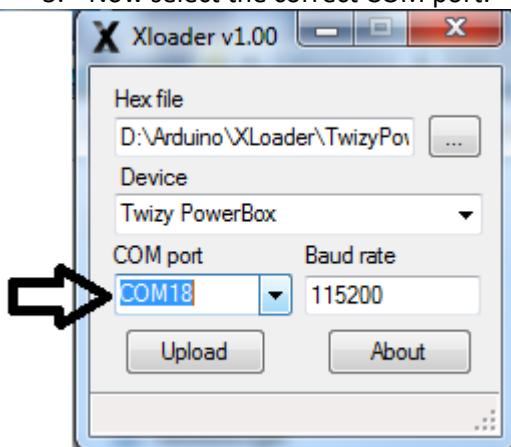
2. Select the firmware hex file.



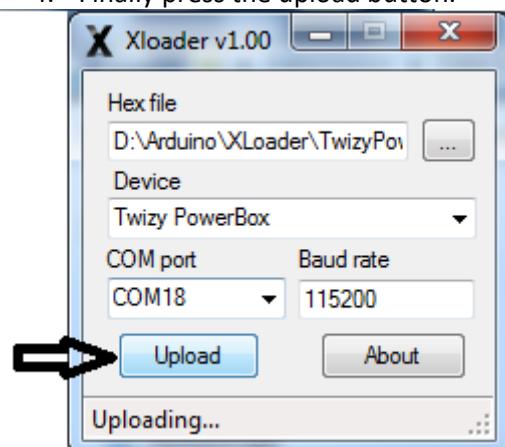
1. Next select Twizy PowerBox v2 in the device field.



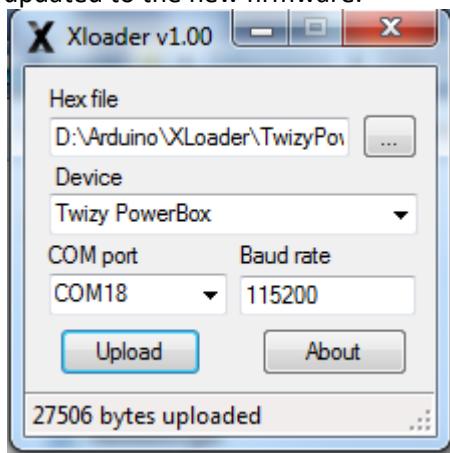
3. Now select the correct COM port.



4. Finally press the upload button.



5. After a few seconds, your PowerBox is updated to the new firmware.



6. You can now disconnect your PowerBox from your computer.

Installing the app

At this moment the app is not available via the Google Play Store, so it must be installed manually.

First you need to allow the installation of third party apps on your phone/tablet.

The procedure can vary slightly on different phones. If you are experiencing problems, Google "allow installation of third party apps" for your phone brand.

How to enable installation of third party apps on an Android™-based smartphone:

Go to Settings on your phone and switch to the "General" tab, if needed.

Tap on the "Security" option.

Tick the tagbox next to the "Unknown Sources" option.

Confirm the warning message by tapping on "OK".

Now you can download the app from [here](#).

The easiest way is to use your phone to download the app. This way it will be easier to install since you do not have to transfer it from your PC to the phone first.

If app install does not start automatically, you will have to find the app in your download folder and execute the apk file from there to install it.

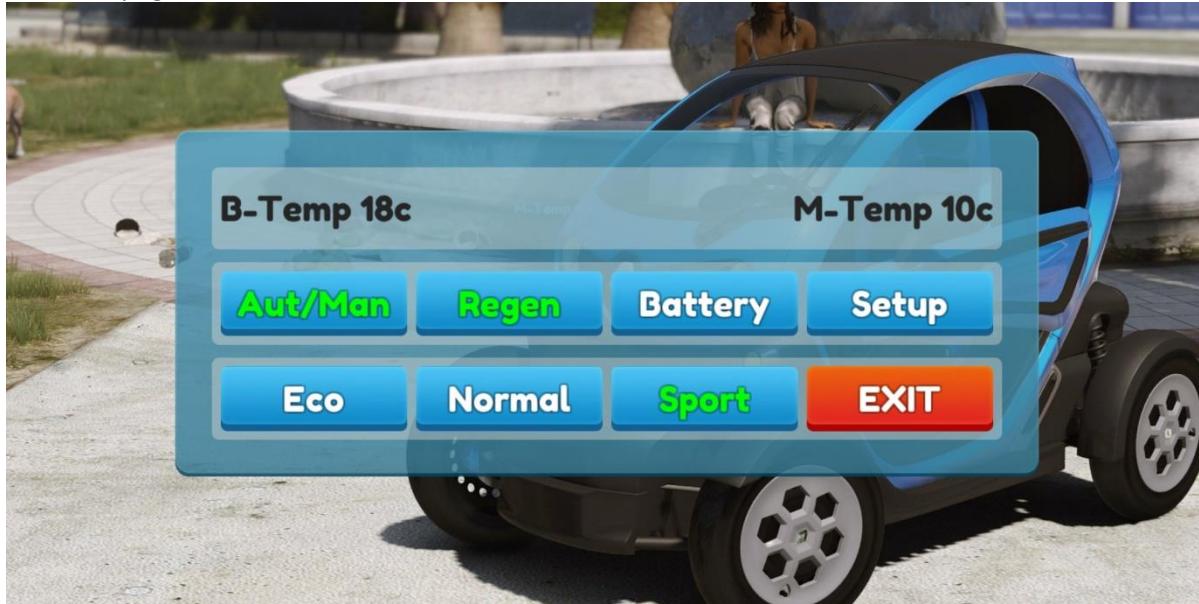
You can untag the tagbox "Unknown Sources" after the installation if you prefer.

Tuning the car for the first time using the Android app

Turn the ignition key to the ON position, then plug the OBD2 connector into diagnostic port which can be found in left glove compartment.

Now start the Twizy Powerbox app and it will automatically search for Powerbox and connect.

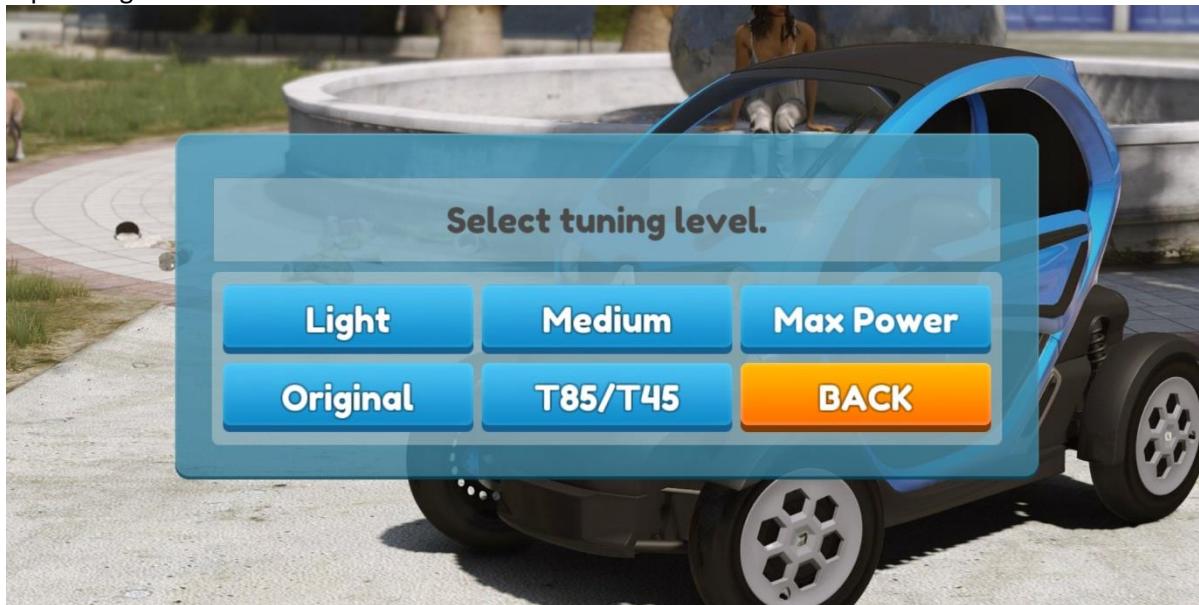
The Main page looks like this:



Now tap Setup:



Tap Tuning:



Next, select the desired tuning option and wait for it to finish.

When the process has finished completely, you will receive the text "Exit Tuning Menu", tap Back and Back until you are back on the Main page.

Important! When finished, turn the ignition key off and on again.

You are now ready to drive.

Additional information about the Main page:

Meaning of the color of the text on the buttons:

Green Regen = Regeneration ON, Red Regen = Regeneration OFF

Green Aut/Man = Auto Mode, Red Aut/Man = Manual Mode

Green ECO, Normal or Sport = ECO, Normal or Sport mode activated, White = deactivated.

B-Temp = Battery temperature

M-Temp = Motor temperature

You can only select the ECO, Normal and Sport driving profiles when in Manual Mode. In Auto Mode, the Powerbox selects the best choice, depending on the motor and battery temperatures.

Setup Menu

In the Setup Menu you can adjust:

Charge button: How much you want to charge the main battery. The default value is 100.

FootBrake button: How much FootBrake regeneration you want. The default value is 250.

Regen Button: How much Regeneration you want during Neutral Braking. The default value 181.

Regen Button = Neutral regeneration.	Here you see the Regen value in per mille. The default value is 181 per mille, which equals 18.1%. Enter a value between 0001 to 1000
FootBrake Button = FootBrake regeneration.	Here you see Regen value in per mille, default value is 251 per mille which is the same as 25.1%. Enter a value between 0001 to 1000

Battery Menu

In the Battery Menu you can find a lot of information about the battery, like Volt per cell and temperature per battery bank. More information might be added in a later release.

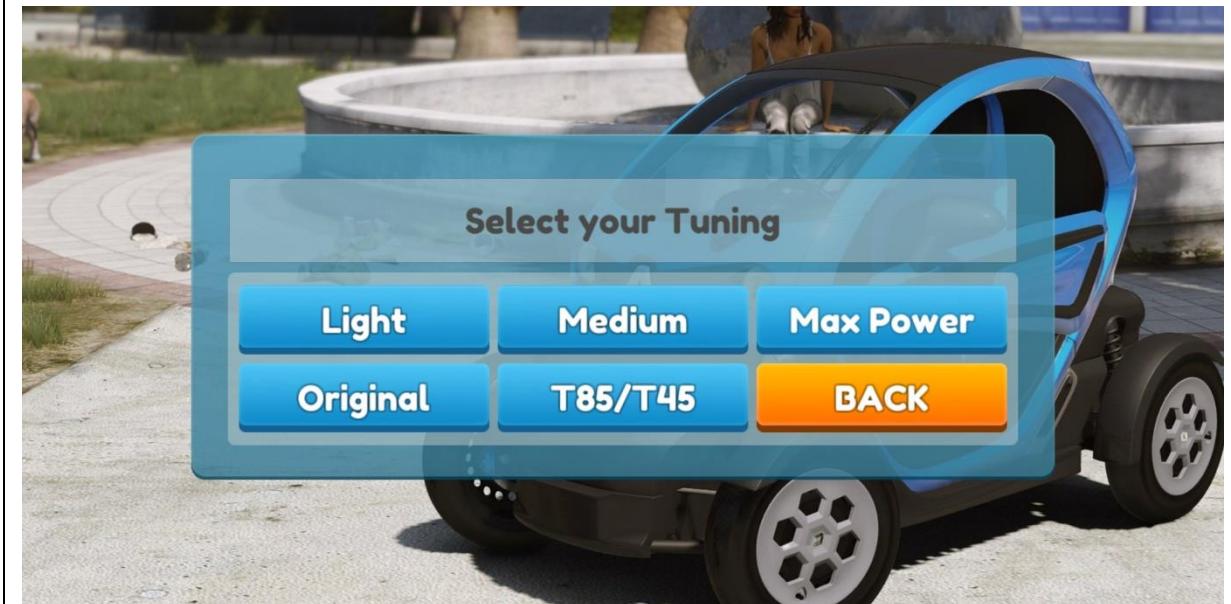




Tuning Menu

In the Tuning Menu you can choose which tuning level you prefer.

- Light Tuning (Up to 80Nm))
- Medium Tuning (Up to 90 Nm)
- MaxPower Tuning (Up to 100Nm)
- Original Tuning (This will reset your Twizy back to the original settings)
- T80 to T45 Tuning (This turns a T80 into T45)



Translated to English by Maiken H.R Nilsen
and Eric van Loon