VOLspeed Ebike Tuning

Bosch Active Line
Bosch Performance Line
V3

Operating Manual
Installation Guide

Attention!

Read these instructions completely before using the device, keep the instructions and pass them on when handing over the device to other persons.

Product Features

The device offers the following functions after installation in eBikes with Bosch drive system (20 / 25 / 32 / 45 km/h):

- Individual activation code adjustable
- Speed limit adjustable via handlebar control buttons
- Adjustable dynamic mode with reduced "wall effect"
- Correct display of speed and distance
- Correct mileage after removal of the tuning module
- Optimized range calculation with active tuning
- Battery indication in percent alternating with the range when tuning is active
- Workshop mode

All settings are made via the handlebar control buttons on the eBike. No smartphone or notebook is required.

The electronic is cast into the housing and thus safely protected against moisture.

Intended Use

The device is only suitable for installation in eBikes with the following Bosch drive systems:

Drive system:	**Display type:**
Active Line	Intuvia, Purion, Nyon, Kiox, Nyon2
Active Line plus	Intuvia, Purion, Nyon, Kiox, Nyon2
Performance Line	Intuvia, Purion, Nyon, Kiox, Nyon2
Performance Line CX	Intuvia, Purion, Nyon, Kiox, Nyon2
Cargo Line	Intuvia, Purion, Nyon, Kiox, Nyon2

Legal and Safety Notes / Product Liability

- **Operation of the eBike in public traffic is no longer permitted after installation of the module. The use is only allowed on private areas or designated test and race tracks.**
- **Damage caused in conjunction with the operation of the eBike will no longer be covered by private liability insurance after installation.**
- **Liability and warranty claims against the dealer or manufacturer of the eBike expire or are constricted.**

- **The eBike is subject to higher mechanical stress when operating at higher speed for which it is not designed. This results in additional safety risks.**
- **The installation and operation of the module is at your own risk. The manufacturer accepts no liability for damage in connection with the installation or operation of the unit.**
- **Please inform yourself about possible further technical and legal consequences before installing the device.**

Technical Data

Housing dimensions:	37mm x 19mm x 9mm (1.46” x 0.75” x 0.36”)
Cable length:	approx. 180mm (7”)
Weight:	0,025kg (0.9oz)
Power consumption:	0,2W
Supply voltage:	12VDC

Installation example Cube Reaction Hybrid Pro 500 / Bosch Performance CX 2020

Required tools:

- Allen key 4mm

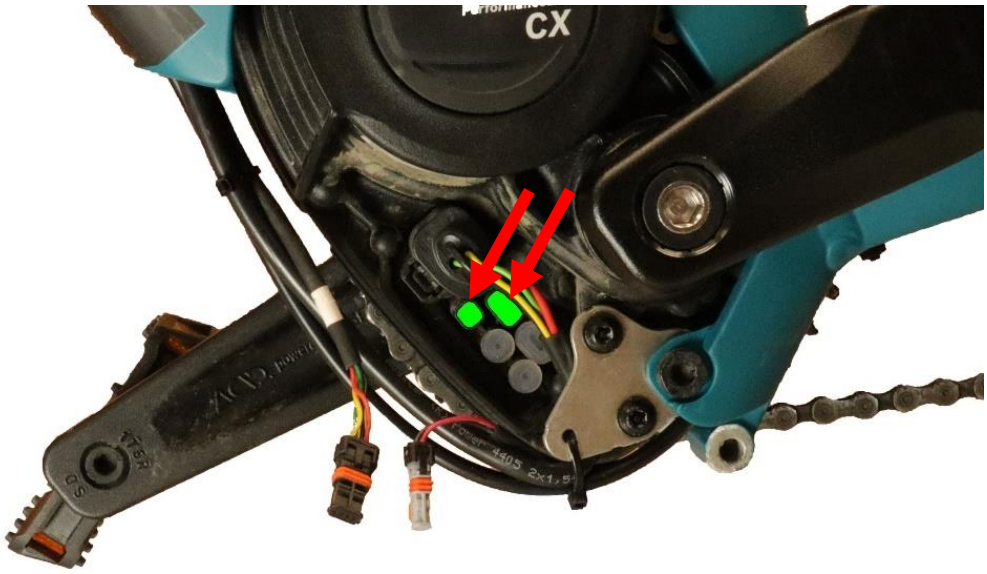
Procedure:

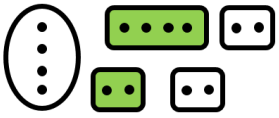
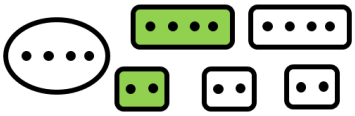
1. Remove battery
2. Remove the motor cover (Allen key 4mm).

Depending on the bicycle model, the motor cover can also be fastened with Torx or Phillips screws.

With many covers it is also necessary to remove the pedal crank. A suitable crank puller is required for this.

3. Disconnect the cables from the two marked sockets. Use the following sketch for other motors as a guide. Disconnect the connectors marked in green.



Motor Gen2: - Active Line - Performance Line (CX) until 2019	
Motor Gen3: - Active Line Plus from 2018 - Performance Line from 2020	
Motor Gen4: - Performance CX from 2020	

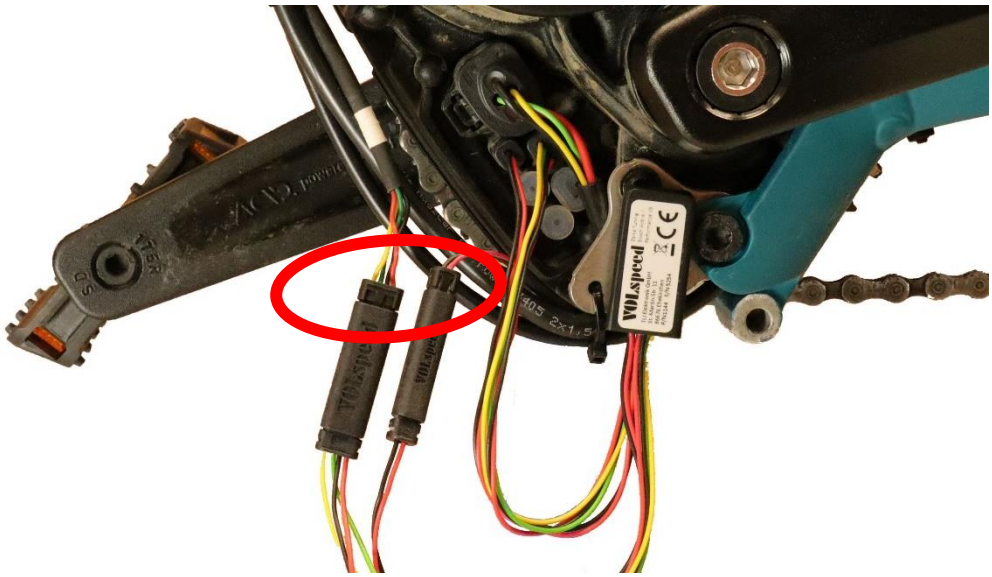
Attention!

Also pay attention to the color of the small connector.

Black: rear light
Blue: front light
Gray: speed sensor

4. Connect the tuning module to the sockets on the motor that have become free. Connect the previously unplugged cables to the other connections of the tuning module.

5. Make sure that all connectors are plugged in as far as they will go.



6. Write down the article number (P/N) and serial number (S/N) on the back of this manual to have the data ready for possible support requests.

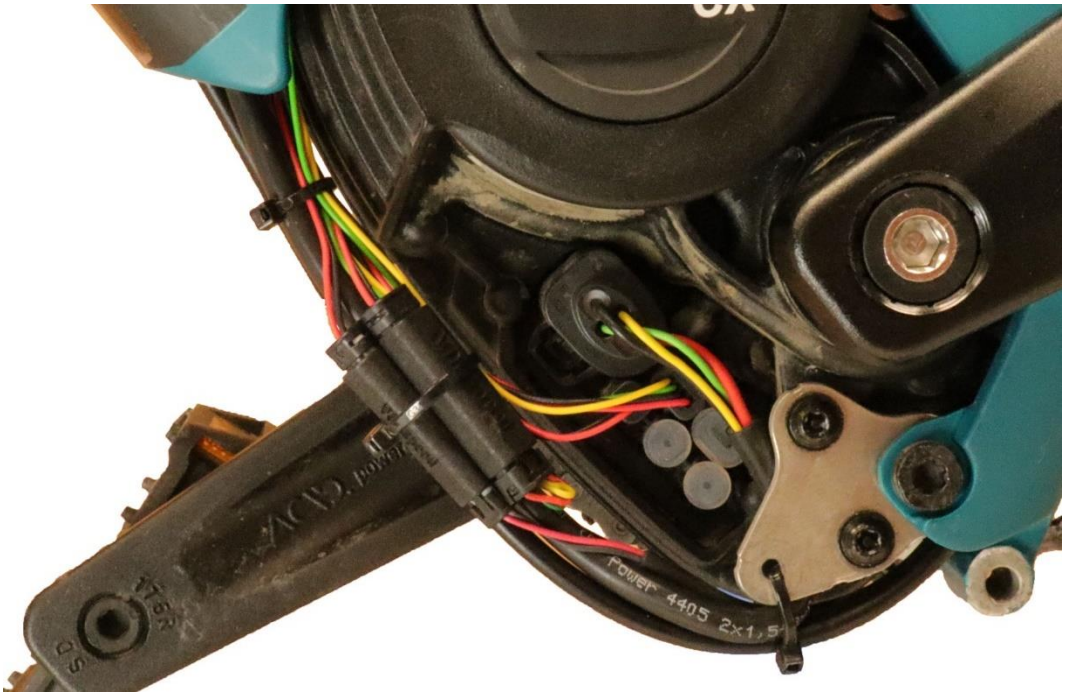
7. Insert the battery and carry out the initialization, see separate point “setup” (page 7).

8. If you want to set an individual activation code to protect the Tuning from unauthorised use, set it now, see point "Activation code" (page 11), otherwise continue with the next step.

	This item is optional. If you do not want to set a code, continue with the next step.

9. Remove the battery again.

10. Place the tuning module in a suitable place and lay the cables so that the cover can be refitted. In the picture the module has been pushed into the down tube.



Due to the large number of different drive systems and covers, it is not possible to define a fixed installation location. It is often possible to place the module directly in the connection area of the motor. It is also possible to place it in the frame tube, although this usually requires the motor to be detached from the frame.

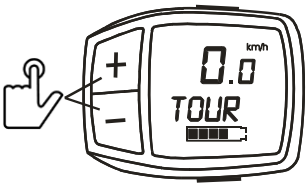
11. Reassemble cover.

12. Activate the tuning as described in the chapter "speed mode" (page 9).

Setup

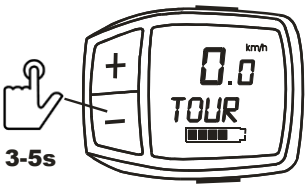
Before using the tuning module for the first time or after converting it to another bike, the setup must always be executed first. Even in the event of malfunctions, the module can be restored to a defined state by executing the setup.

> The following illustrations show the Purion display. For the Nyon, Kiox or Intuvia, press the corresponding buttons on the control unit.
> Please set the display to km/h before. If set to mph you get different readings during setup.

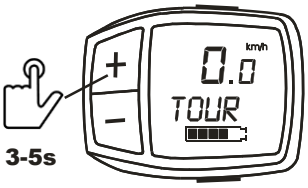


If an activation code is set, enter it now, otherwise continue.
Input example:
Code 32: press 3x “minus”, afterwards 2x “plus”.
Code 3: press 3x “plus”.

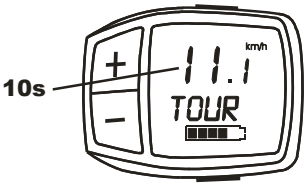
> No code is set in the new state. The code is not displayed when it is entered. Enter the code quickly and continue immediately with the next step. If the code is not entered correctly, wait 5 seconds before trying again.



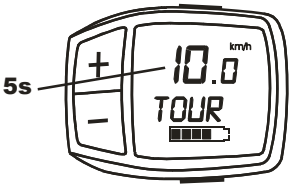
Press “minus” for 3 to 5 seconds.



Release “minus” button and within one second, press “plus” for 3 to 5 seconds.

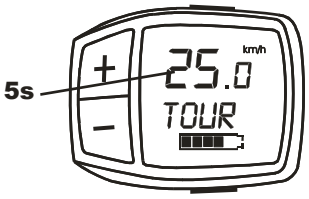


Speed 11.1 km/h is displayed for 10 seconds.



Adjustment factor speed limit. Only adjust if there are problems, see FAQ. If necessary, change within 5 seconds using the “plus” and "minus" buttons. Possible values: 7.0..13.0 (= 70..130%). Default value: 100%.

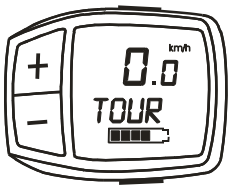
If the display changes from 11.1 directly to 0.0, the wiring of the module is faulty. The 2-pin connector to the motor is connected to the wrong socket.



Set the factory speed limit here or activate the workshop mode. If necessary, change within 5 seconds using the “plus” and “minus” buttons. Possible values: 20, 25, 32 (=20mph) and 45km/h, Default value: 25.0. Set 1.0 for the workshop mode.

For a European e-bike, the factory speed limit is normally 25km/h – 15.5mph. You do not need to press anything in this case.

If you set a value that is too high, the tuning will not work. If the bike supports up to 25km/h ex work you have to set 25km/h here.



As soon as setup displays 0.0 km/h, the setup is finished.

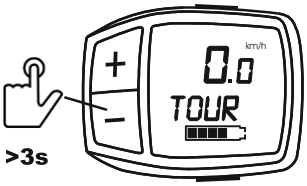
Speed Mode

When speed mode is activated, the speed limit for the motor assistance is increased. The limit can be set from 25[1] to 99 km/h (15.5[1] to 61.5mph).

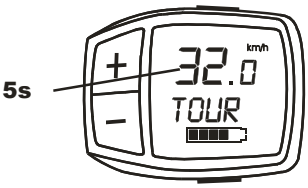
Turning off the eBike automatically turns off speed mode and must be reactivated after the bike is turned on.

> If the limitation is not removed despite being activated, the wrong eBike type was set during setup. For eBikes that support up to 25 km/h without tuning, the eBike type must also be set to "25".

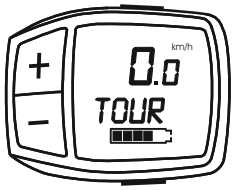
Enable speed mode – **No activation code set**



Press "minus" for > 3 seconds while standstill or while driving.

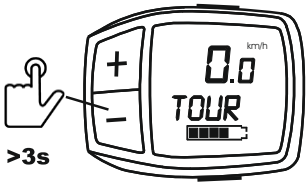


Speed limit is displayed for 5 seconds. If desired, use the "plus" and "minus" buttons to change. Possible values: 25[1] to 99 km/h (15.5 to 61.5mph). Default value: 32 km/h (19.8mph). Set value will be stored.

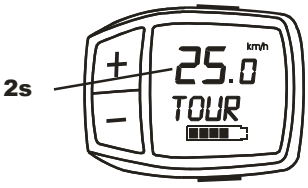


Display shows the normal driving speed again. Speed mode is active.

Disable speed mode



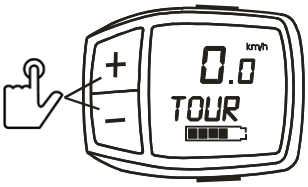
Press "minus" for > 3 seconds.



Display shows the factory speed limit for 2 seconds. Speed mode is off.

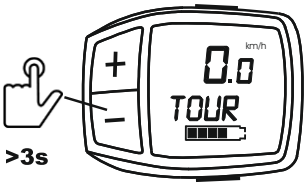
[1] The lowest possible value is always the factory speed limit set during setup.

Enable speed mode – **Activation code set**

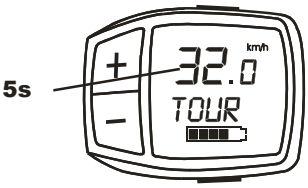


Enter the activation code. Always press the minus keystrokes first, then the plus keystrokes.
Input example:
Code 32: press 3x “minus”, afterwards 2x “plus”.
Code 3: press 3x “plus”.

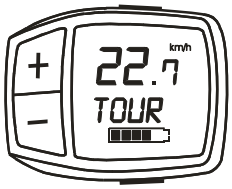
Code is not displayed during input. Enter the code quickly and proceed immediately to the next step. If you make a mistake, wait 5 seconds before trying again.



Press "minus" for > 3 seconds.



Speed limit is displayed for 5 seconds. If desired, use the "plus" and "minus" buttons to change. Possible values: 25[1] to 99 km/ h (15.5 to 61.5mph). Default value: 32 km/h (19.8mph). Set value will be stored.



Display shows the normal driving speed again. Speed mode is active.

[1] The lowest possible value is always the factory speed limit set during setup.

Activation Code

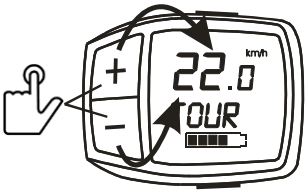
With the activation code set, the "Speed Mode" and "Setup" functions can only be activated after entering this code. This prevents unauthorized activation. The code consists of 0 to 3 key presses of the minus button, followed by 1 to 3 key presses of the plus button.

	Set the display to km/h before. If set to mph you get different readings.

Preparation set / delete code

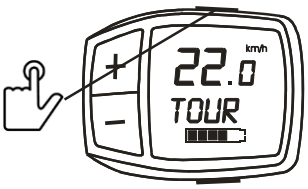
Disconnect the two smaller, two-pin connectors of the tuning module from the motor and the wiring and connect them together as shown in the following illustration.

Set code



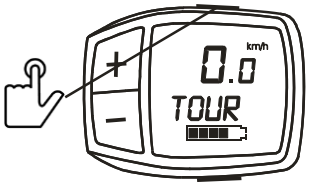
Switch on the bike and set the code with the plus and minus buttons. The display shows the number of keystrokes as speed.
Possible values: minus → 0..3, plus → 1..3
Default value: 0

	If a code was previously defined, it will be deleted. Unauthorized reading of the code is therefore not possible. A code can only be set if the setup has been carried out successfully first.



Note the set value and switch off the bike. This stores the code. Then bring the wiring back to its original state and check whether it is possible to activate the speed mode with the code before assembling.

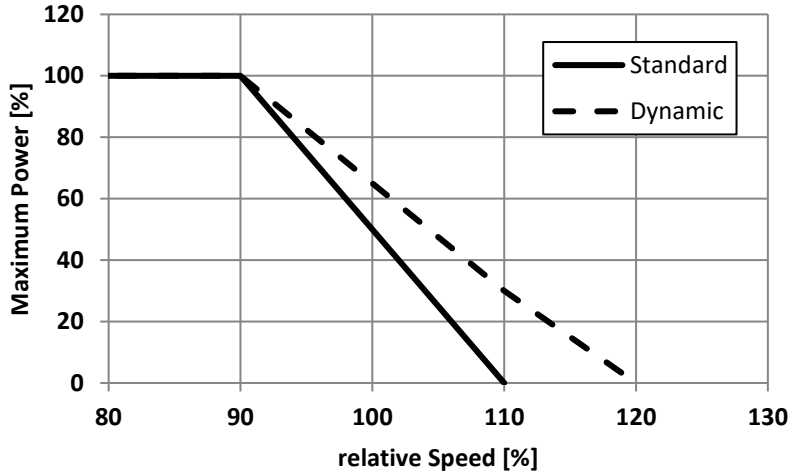
Delete code

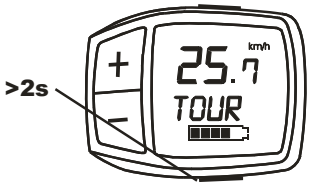


Turn on the bike. 0.0 km/h is displayed. Switch the bike off again. This will delete the code. Then restore the wiring to its original condition.

Dynamic Mode

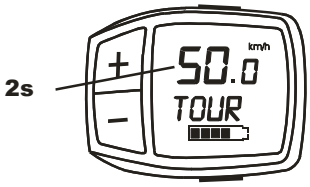
Exceeding the speed limit the motor power is reduced by default very much. A higher pedal force then results no longer in a higher speed, but in a lower motor assistance. For a more natural driving emotion in the dynamic mode the reduction is spread over a larger speed range, the so-called "wall effect" is significantly reduced and it can be driven with much more constant pedal force. The dynamic mode can only be activated when the speed mode is activated.





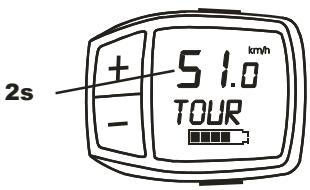
Press the WALK button for 2 seconds while driving at more than 10km/h (6.2mph) with the speed mode activated.

Note Purion: When the display shows "WALK+", release the WALK button and keep the PLUS button pressed for 3 seconds.



Dynamic mode off: 50 km/h (31.0mph) is displayed for 2 seconds. The set value is stored.

Or:



Dynamic mode on: 51 km/h (31.6mph) is displayed for 2 seconds. The set value is stored.

Range / Charge Status

When the speed mode is activated, a range calculated by the tuning module is displayed instead of the value from the motor control after 5% battery discharge. The reason for this is that the engine control can no longer correctly calculate the range due to the tuning. The tuning module uses the battery charge level and the kilometers driven for its own calculation.

Alternating to the range, the battery charge level is displayed in percent. This is done for one second, the display of the charge, then again for 4 seconds, the display of the range.

If the display is operated in the setting "mph" instead of "km/h", the displayed charge level is too low by a factor of 0.62. When the battery is full, only 62% is displayed instead of 100%.

FAQ

The setup cannot be activated although I follow the steps described.

To prevent accidental activation of the setup, the time slots for the keystrokes to activate the setup are deliberately narrow. Failure to meet the timetable is therefore the most common reason why the setup does not start. For assistance, use a clock with seconds indication to help and press the “minus” key for as exactly 4 seconds as possible, release it and then immediately press the “plus” key until the display shows 11.1km/h.

An activation code may also be set. If this is known, you must first enter the activation code. If you have forgotten it, delete the code as described in the "Activation code" section.

Everything works as described, but motor supports only up to 25km/h despite activated speed mode.

Probably the wrong bike type was set during setup. For example, on a bike that supports up to 25km/h ex works, the value 45 was set instead of 25. Start the setup again and set the correct bike type.

The motor output fluctuates at low speed or it is not possible to reach the full motor power.

The motor control presumably limits at a too low speed. Run the setup again and reduce the adjustment factor speed limit to a smaller value. If necessary, repeat the process until the limiting behavior is correct.

Reduce the adjustment factor speed limit, e.g. to 92%, if the bike without tuning limits at 23km/h instead of 25km/h → 23 / 25 * 100% = 92%.

Activation of Speed mode not possible.

Setup did not run or did not run correctly. Start setup again. If the display does not show 11.1km/h or the display jumps from 11.1km/h directly to 0.0km/h, check the speed sensor wiring (2-wire cable).

An activation code may also be set. If this is known, you must first enter the activation code. If you have forgotten it, delete the code as described in the "Activation code" section.

The displayed distance (Odometer, Trip) or the speed is not correct.

The measurement of the distance and the speed takes place in the motor control unit, which uses the wheel circumference stored there. Adjust it as described in the Intuvia, Kiox or Nyon operating manual, or have the value changed by your dealer (Purion). Then run the setup again.

Must the tuning be removed for software updates of the motor control or the display?

No. However, you must activate workshop mode, see “Setup”. As a result, the tuning module is completely deactivated and no longer intervenes in the data traffic between motor control and display. After the workshop visit, you must run the setup again to deactivate the workshop mode.

Before activating workshop mode, first switch the bike on and activate the speed mode. Wait until the drive system shuts off by itself. Here, the mileage of the motor control is adjusted with that of the tuning module.

Does the tuning module also work after software updates of the motor control or the display?

In principle, it is possible that the functionality of the module is impaired by software updates. A list of tested software versions can be found on our website.

Is the total mileage correct even after removing the module?

Yes. The total km measured by the motor control unit are not changed by the tuning. This is ensured by a continuously working compensation function in the tuning module. However, before removing the module, the bike should remain switched on at standstill with activated speed mode until it shuts off by itself. This will ensure that the compensation function has correctly adjusted the mileage.

Is there anything to consider when change to another display, e.g. from Purion to Kiox?

Yes. You should run the setup again after installing the new display. If this is not carried out again, key presses may no longer be correctly recognized by the tuning module. If the setup can no longer be started and an activation code has been set, first delete the code, run the setup again and then set the code again.

Why is my display flashing two numbers?

When the tuning module is activated, your display will show the battery charge in % for one second followed by the range calculation for four seconds.

Technical Support

For questions, suggestions or problems please contact us by email or phone.
TLI Elektronik GmbH
St.-Martin-Str. 11
86676 Ehekirchen
info@volspeed.de
phone: +49 (0) 8253 / 9279902

In addition to your request for support inquiries, please include the following information:

- Serial number and purchase number of the tuning module (S/N, P/N)
- eBike manufacturer, type and year of manufacture
- Display type (e.g. Nyon)
- Software version of display
- Drive unit type (e.g. Active Line)
- Software version of drive unit
- Speed limit drive unit (e.g. 25km/h)

To ensure that you always have the device data at hand, you can enter it here before installing the device:

Purchase number (P/N): _____

Serial number (S/N): _____

Disposal

The tuning module should be disposed of in an environmentally correct manner.

For EC countries:

Electronic devices are valuable materials and do not belong in the household waste.

Dispose of the product at the end of its life in accordance with applicable legislation.

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