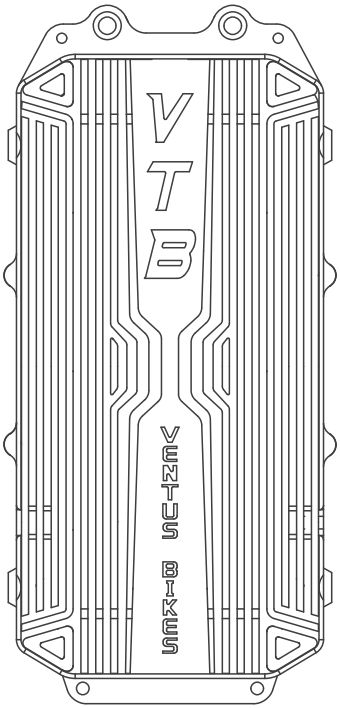
Venture To Begin

VTB Controller



Ultra Bee User Modification Manual

Contents

I.Function Overview

1.Structural Design

- Supports CNC water-cooling radiators
- CNC air cooled heatsink option
- Ingress protection IP67 rated
- High-reliability redundant design
- High-voltage short-circuit protection for harnesses
- Intelligent battery protection system
- Fully potted vibration-resistant protection
- Sine wave vector control

2.Specifications and Parameters

Maximum bus current	Maximum phase current	Peak output power	Operating temperature range
500A	960A	44kW	-25℃ - 80℃
	Absolute voltage range	Operating voltage range	Maximum efficiency
	30V to 99V	48V to 84V	>95%

3.Compatible Models

- Sur-Ron Light Bee
- Sur-Ron Ultra Bee
- TALARIA Sting
- TALARIA X3
- 79BIKE Falcon
- E-Ride Pro SS

4.Compatible Motors

- VTB Beast 28kW
- VTB Beast 35kW
- Stock Light Bee Motor
- Stock Ultra Bee Motor
- Stock Sting 8.0 Motor
- Stock E-Ride Motor
- QS165 Motor by QS Motor
- EBMX XLB-60 Motor
- EBMX XUB-80 Motor
- SOTION LTXS Motor
- KO Encoder Motor

5.Compatible Batteries

14S	Any 48V
16S	Stock Light Bee / Sting 8.0 60V 38.5Ah Samsung/LG
	Stock Light Bee / Sting 8.0 60V 40Ah Samsung/LG
	Stock Talaria X3 60V 38.5Ah LG
	6055 60V 55Ah
	6045 60V 45Ah
17S	6355 63V55Ah
18S	6642 66V42Ah
20S	VTB7245-9C 72V45Ah Samsung 50S
	VTB7250-9C 72V50Ah Samsung 50S
	VTB7250-5C 72V50Ah Samsung 50G
	Stock Ultra Bee 74V 55Ah Farasis P53B
	Stock E-Ride Pro SS 72V 40Ah Samsung 50G
	EBMX/EWATT 72V42Ah
	EBMX/EWATT 72V57Ah
	EWATT 72V76Ah
	EWATT 80.3V76Ah
	EWATT 72V44Ah
22S	EWATT 80.3V76Ah
	8045 80V45Ah

6.App Introduction

- Free download across multiple platforms
- Throttle fine-tuning
- Low battery throttling and power auto-tuning
- Multiple separate programmable power settings
- EBS gear adjustment
- keyless entry
- E-assist brake
- Motor calibration
- Speed calibration
- Bluetooth password
- Power-Off Protection (Brake, Tilt, Stand)

II. Preparations Before Installation

1.Installation Instructions

The V9600 controller is currently designed to operate in conjunction with the VTBGZ display, multi-functional combination switch, and regen brake (thumb brake). These components are packaged together with the controller for convenience. The installation of the accompanying components is straight forward, independently. It is recommended, however, that users refer to the contents of this manual for guidance during the i nstallation process. The V9600 is a plug-and-play controller, requiring no prior knowledge of electronics or programming for installation and configuration.

2.Packing List


V9600 Controller×1

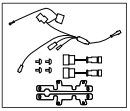

Display×1


Combination switch×1


Regen Brake×1
(thumb brake)


Display Mount×1
(with installation screws)


Dust-proof Rubber Covers for Terminals×5


Compatible Bike Accessory Kit×1


Terminal Screws×5

Installation Manual×1

Accessory Kit Contents

Mid-section Wiring Harness-Ultra Bee Model×1
The model adapter connects to the bike's main wiring harness, with the upper and lower interfaces connecting to the longer controller harness and the display harness, respectively.

General Encoder Motor Adapter×1
Connects to the motor encoder harness (for encoder-effect motors)

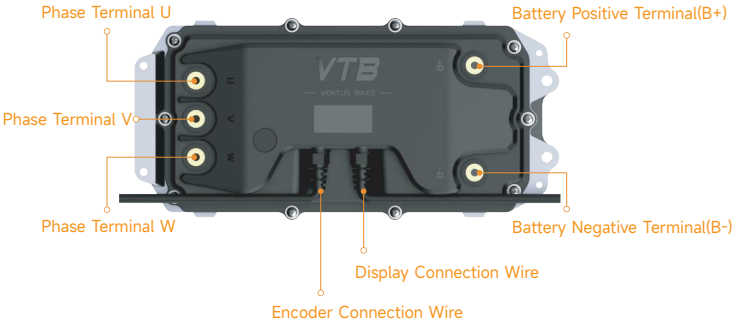
Right Bracket×1
Left Bracket×1
Secures the V9600 Controller

Ultra Bee Motor Adapter×1
Connects to the motor encoder harness

M6*10 Round-Head Screws×4
Secures the V9600 Controller

II. Preparations Before Installation

3.Route Description



Special Note

The V9600 controller is equipped with a motor calibration, allowing the phase connection sequence to be unrestricted and freely arranged. The designations of U, V, and W in this context are merely illustrative labels. This innovative feature is intended to accommodate various motor types, ensuring the system can automatically adjust phase sequences based on the connected motor to achieve optimal performance.

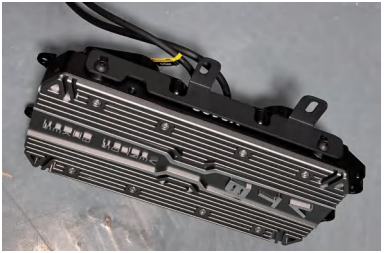
4.Installation Hole Diagram

The installation holes for the Ultra Bee are indicated by the four positions outlined in the rectangular frame in the diagram.

III. Installation and Precautions

1.Installing the Controller Bracket

Fix the controller mounting brackets from the accessory pack to both sides of the controller.



2.Connecting Motor Phase Wires

Connect the motor phase wires to the phase terminals. It is not necessary to differentiate between cable colors, as the connection sequence is unrestricted. While the phase wire lengths may vary, great care must be taken to avoid entanglement during the connection process. Use a wrench to apply a torque of 16 N·m to securely fasten the terminal screws, ensuring all connections are robust to prevent potential loosening during operation. Once all the phase wires are correctly and securely connected, cover the connection points with dust-proof rubber covers.

Note

The V9600 controller is equipped with a motor calibration feature, allowing the phase wire connection sequence to remain flexible. Connections should therefore be arranged according to the actual length of the wiring harness for ease of installation and organization.

3.Connecting the Positive and Negative Power Terminals

Connect the power lines following the sequence: red for the positive terminal and black for the negative terminal. The controller negative harness is connected to the battery negative terminal of the controller. Ensure that every connection point is securely fastened to prevent loosening during operation. Once the positive and negative power lines and the controller negative harness are properly fixed, cover the connection points with dust-proof rubber covers for protection.

The final appearance after completing the installation of both the motor phase wires and the positive and negative power lines is shown in the diagram below:

III. Installation and Precautions

4. Connecting the Motor Plug

Please choose either the Ultra Bee motor adapter or the general encoder motor adapter for installation based on specific requirements; only one is needed. VTB is dedicated to providing comprehensive service to our customers and therefore offers an alternative cable as a backup. We deeply appreciate your support and trust.

The stock VTB motor does not require the use of a motor adapter.

For the stock Ultra Bee motor,
a Ultra Bee motor adapter is required.

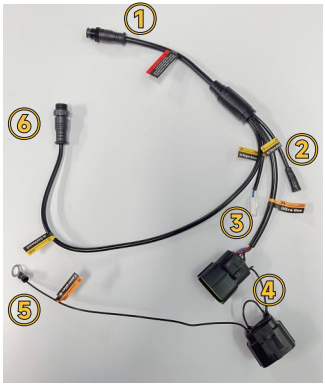
For third-party encoder motors,
a general encoder motor adapter is needed.

One end of the motor adapter connects to the motor harness interface, while the other end connects to the shorter harness of the controller.

Note

When connecting the square plug, a "click" sound indicates that the plug has been securely and correctly connected. If the plug is not fully inserted, it may loosen due to vibrations, resulting in functional abnormalities.

5.Connect the Wiring Harness Plug



①Main signal interface of the controller, connected to the longer wiring harness of the controller.

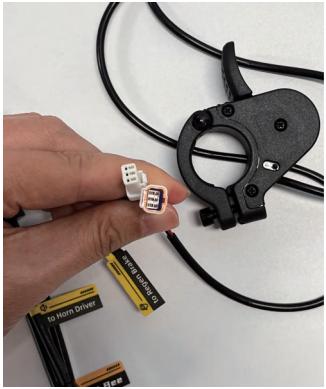
②Use the OEM horn button for control.
No connection is required here.

③Regen brake (thumb brake) plug, connected to the regen brake (thumb brake).

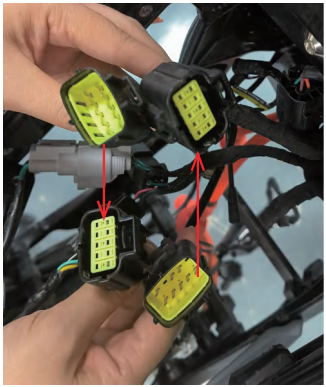
④Ultra Bee model adapter harness, connected to the bike's main wiring harness.

⑤Controller negative harness, connected to the negative terminal of the controller.

⑥Display communication interface connected to the display wiring harness.



Interface③connects to the electronic brake (thumb brake) harness interface.



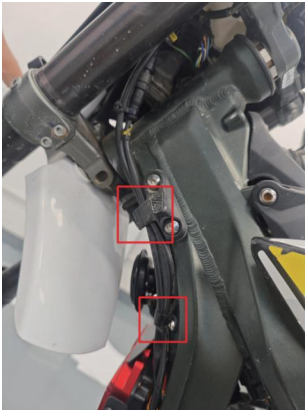
Interface ④ connects to the main bike wiring harness functional interface, with the male connectors connecting to the female connectors respectively.

Note

The pins of Interface ① are relatively delicate; exercise caution during connection to prevent misalignment or bending of the pins. When connecting the square plug, a "click" sound indicates that the plug has been securely and correctly connected. If the plug is not fully inserted, it may loosen due to vibrations, resulting in functional abnormalities.

6.Organize the Wiring Harness

Place the mid-section harness on the left side of the controller. The mid-section harness with connector ⑥ can be routed through the fixing ring to connect to the display. The lower harness is placed between the motor and the controller, while the upper harness is placed inside the inner compartment. Finally, install the front battery cover to complete the process.



Note

When organizing the wiring harness, try to place the harness connectors into the dustproof rubber sleeves to extend the service life of the harness.

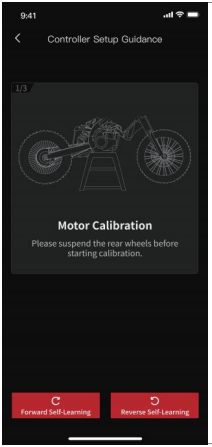
7.Installing the Controller

Begin by aligning and securing the lower mounting holes of the controller using screws from the accessory kit, fastening them with a wrench. Adjust the position of the controller to align with the upper mounting holes, then tighten the screws with a wrench. Secure all four mounting screws tightly to ensure the controller is stable and free of movement, and finally, tighten the screws on the top of the motor cover to complete the installation.

Note

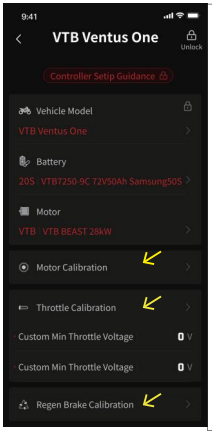
Ensure the installation area is sufficiently clear, and check through the gaps in the front battery panel for any pinched wires around the controller. Initially, do not over-tighten the top screws to allow for adjustments when aligning the lower mounting holes.

8.Controller Setup Guide



After installing the controller, open the app and select the vehicle model on the main page to automatically enter the controller setup guide. Follow the instructions to complete the setup. During the guide, observe the wheel rotation direction during motor calibration. If it rotates correctly (forward) and a success message appears, the setup is complete.If not, select the alternative direction for calibration. Once familiar with the app's operations, you can independently perform motor self-learning, throttle calibration, or regen brake （thumb brake）calibration in the advanced settings.

At the end of the throttle calibration, you need to select a gap; for normal use, choose the standard gap. The throttle gap refers to the minimum throttle opening needed for a response, with the ultra-small gap being even smaller than the standard gap.



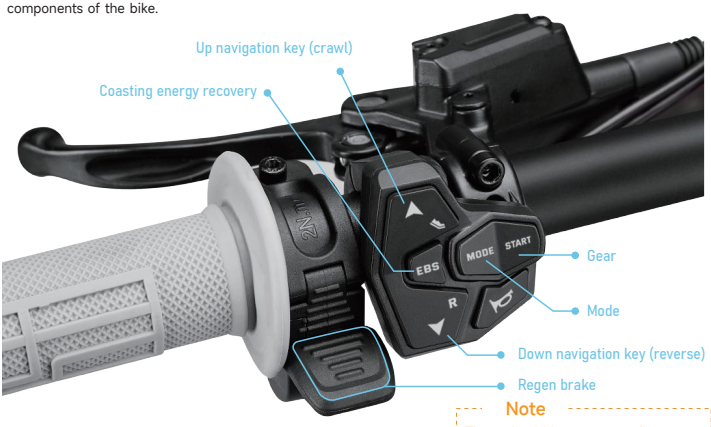
When adjusting battery or motor settings, you must first click on "Unlock" in the upper-right corner of the page and enter the unlock password: 123686, before making any changes.

Exercise extreme caution when altering battery or motor settings, as such modifications are not recommended for general users. The advanced settings are designed to meet the needs of users seeking a more refined and precise experience. The password is implemented as a safeguard to ensure the safety of non-professional users.

IV. Supporting Components

1.Function Diagram

For first-time users, please refer to the labeled diagram to identify and familiarize yourself with the various components of the bike.



·EBS(Electronic Braking System)
Key : Click " **EBS** " to select, then use the up/down navigation keys to adjust the level.

·Mode
Key : Click " **MODE** " to select, then use the up/down navigation keys to switch driving modes.

Note

There should be an appropriate gap between the regen brake and the handle grip. Insufficient spacing may hinder the regen brake's proper reset function, while excessive spacing could compromise the comfort of use.

·Neutral (N)
Key : Press and hold "**START**" to enter N mode.

Description: This is the default gear upon bike startup. The vehicle can move freely, the regen brake is active, and throttle input is disabled.

·Drive (D)
Key : Click "**START**" to switch gear.

Description: When both the "Ready" and "D" indicators are on, gently press the throttle to start forward movement.

·Park (P)
Key : Click "**START**" to switch gear.

Description: When only the "P" indicator is on, the bike remains stable while parked. The rear wheel is locked by the motor and cannot rotate.

·Reverse (R)
Key : Press and hold" R ▼ "to enter reverse mode.

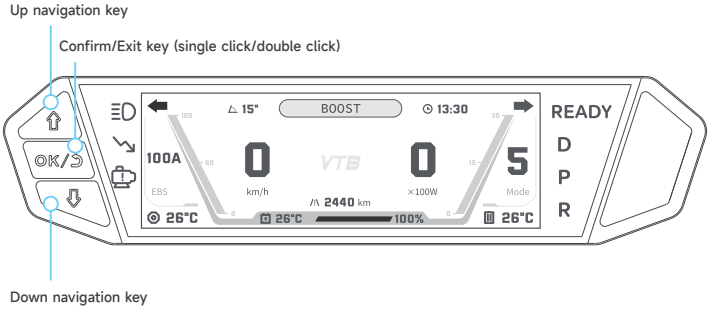
Description: When both the "Ready" and "R" indicators are on, gently press the throttle to reverse. Releasing the throttle exits reverse mode.

·Crawl (🚶)
Key : Press and hold" ▲ 🚶 "to enter crawl mode.

Description: When only the "Ready" indicator is on, the rear wheel is locked against reverse rotation. Throttle input is enabled to assist forward pushing. Pressing the navigation key or switching the gear will exit crawl mode.

IV. Supporting Components

2.Display Introduction



Left Turn Signal	Right Turn Signal	BOOST Mode
Hign Beam Indicator	Slope Angle	
Power Reduction Indicator	Clock	100A EBS Coasting energy recovery; 5 Mode
Engine Fault	0 km/h Current Speed	
READY READY Indicator	0 ×100W Current Power	
D Drive	Total Mileage	Real-Time Speed Variation Bar; Real-Time Power Consumption Bar
P Park	26°C Motor Temperature	
R Reverse	26°C Controller Temperature	
100% Battery Level	26°C Battery Temperature	

IV. Supporting Components

①Information Page

Press the up or down navigation keys '  ' to enter the information page, where you can view riding, controller, and battery information. Press the OK key '  ' to quickly return to the home page.

②Menu Page

On the main page, press the OK key '  ' to enter the display menu. Use the up or down navigation keys '  ' to select 'Settings,' then press the OK key again to access it.

Press and hold the OK key to return to the main page.

③Dashboard Style Toggle

Press and hold the OK key '  ' on the main page to switch the dashboard style.

Operational Reminders:

·Gear switching is disabled when the speed exceeds 10 km/h (speed limit) or when a fault code is detected, to ensure riding safety.
·Understanding the functions and characteristics of each gear will help you operate the bike more efficiently and safely.
·Regularly inspect the gear system to ensure its proper functioning and safety.

IV. Supporting Components

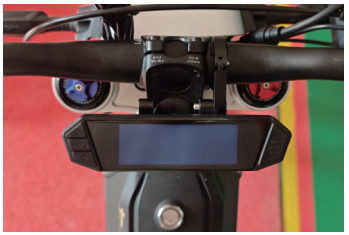
3.Display Menu

Menu Name	Function Description
Create Timer	Create a timer in P gear mode to record riding duration or lap time.
Timer Record	View and manage saved riding time records.
Metric/ British	Switch between metric and imperial units for display.
Language	Select the display language on the instrument; switch between Simplified Chinese and English.
Time	Adjust the current time display on the instrument.
Brightness	Modify the backlight brightness of the display.
Volume	Turn on/off system alerts or adjust the volume of system alerts.
Speaker/ Horn	Not currently supported.
Angle Setting-Slope Calibration	Calibrate the climbing angle on level ground, displayed in the upper left corner of the display home page.
Angle Setting-Tilt Protection	Enable/disable the built-in tilt protection feature and set the tilt angle. An additional tilt sensor is built into the bike, which can be toggled in the app's advanced settings.
BLE Unlock	Automatically unlock the bike when the phone is near. Default is unlocked.
PWD Unlock	Set a password for bike unlocking; can be set between 1-8 digits. Default is no password.
Headlight	Not currently supported.
Battery Bind	Support for binding Ant BMS; use Bluetooth to bind battery BMS for accurate battery information. If the battery does not support binding, choose direct voltage reading to estimate charge.
Updates	Continuous optimization; watch for app update notifications.
MODB	Not yet available.
MODS	Not yet available.
Speed CAL	Calibrate the instrument display speed to match the actual speed. Do not turn off the power or restart the bike during the save process. Setting and saving in the app is recommended.
Throttle CAL	Adjust and calibrate the throttle sensor response. Do not turn off the power or restart the bike during the save process. Setting and saving in the app is recommended.
Brake CAL	Calibrate the electronic braking system response. Do not turn off the power or restart the bike during the save process. Setting and saving in the app is recommended.
Motor CAL	Identify and adapt to motor characteristic parameters. Do not turn off the power or restart the bike during the save process. Setting and saving in the app is recommended.
About	View firmware version; press OK to view instrument error codes. Please contact customer support in case of instrument errors.

IV. Supporting Components

During the installation of the display, you can adjust its position by modifying the installation method of the versatile bracket to suit various riding scenarios, such as off-road or on-road conditions. The installation method of the versatile bracket varies slightly depending on the type of stem. Common stem types include standard stems and double-clamp stems. Thefollowing installation guidelines are for reference only; specific installation should be tailored to individual needs and actual circumstances.

For off-road scenarios, it is recommended to install the display behind the stem to provide maximum protection. The primary difference between standard stems and double-clamp stems lies in the orientation of the display bracket clamp. The installation effects are illustrated as follows:

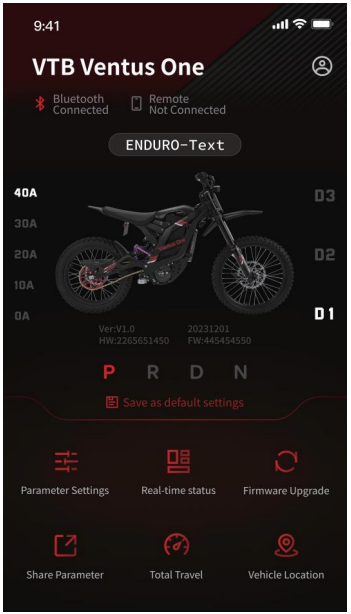


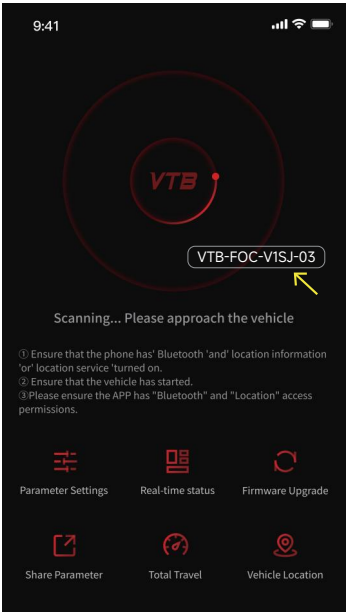
For on-road scenarios, it is recommended to mount the display above the stem to enhance the overall aesthetic of the vehicle. The difference between standard stems and double-clampstems lies in the orientation of the display bracket clamp. The installation results are demonstrated as follows:

V. APP Connection and Configuration

1.How to Connect

Download and install the VTB application. Ensure that your phone's "Bluetooth" and "Location Information" or "Location Services" are enabled. Confirm the vehicle is powered on and that the app has obtained the necessary Bluetooth and location permissions. On the main page, select the controller name and tap to connect. Once connected successfully, the current status of the vehicle will be displayed.

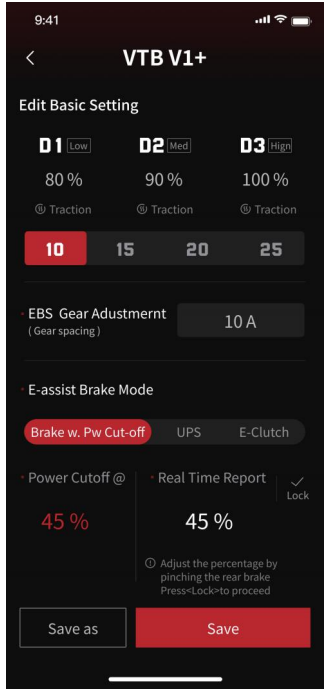




2. Basic Setup

① D-Gear Switching

D1, D2, and D3 adjust the traction level, representing a percentage of the maximum traction.
10, 15, 20, and 25 indicate the proportional intervals for gear switching.
For example:
If the interval is 10, the traction level for D1, D2, and D3 are 80%, 90%, and 100%, respectively.
If the interval is 15, the traction level for D1, D2, and D3 are 70%, 85%, and 100%, respectively.



②EBS(Electronic Braking System)

·Adjust the EBS setting to control deceleration, reducing hand fatigue from frequent manual braking, especially on long downhill stretches. This uses regenerative braking technology to convert kinetic energy into electrical power, extending the bike's range.
·Riders can adjust the deceleration effect based on road conditions for flexible terrain adaptation.
·'EBS+' increases the deceleration effect and raises the regen increment, with a maximum increase to 200A.
·'EBS-' decreases the deceleration effect and reduces the regen increment, with a minimum reduction to 0.
·Set the EBS regen current increment, which is the gear interval, in the app. The maximum interval is 50A.

③ Regen Braking

·The V1+ is equipped with an advanced electronic braking system, providing precise and reliable braking performance.
·Users can switch electronic braking modes in the 'VTB' app, with three options: brake power-off, UPS, and electronic clutch.

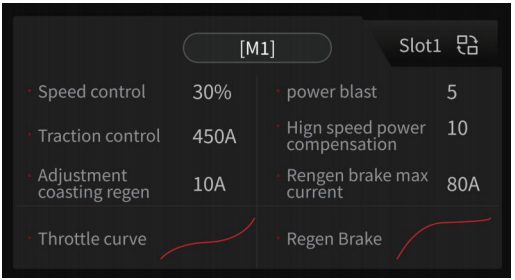
Note:
·Regularly inspect the electronic brake voltage. The standard range is 0.85V ~ 4.2V to ensure proper operation.
·Use the brakes appropriately according to road conditions, especially on steep slopes and slippery surfaces, to enhance safety.

V. APP Connection and Configuration

3. Mode Settings

①Ride Mode

·The V1+ allows for quick switching between five ride modes using the 'MODE' combination switch, defaulting to the first five modes from the official mode library.



②Official Mode Library

Users can quickly add mode profiles from the official library to the mode slots. Available options include:

·EASYGO：Easy-to-use mode,low power,slow acceleration,low top speed,no field weakening,suitable for beginners or children.

·ECO：Moderate power and acceleration, no field weakening, offering better power-saving performance. Suitable for daily battery-saving trips.

·Sport:Moderate power, high top speed, low field weakening, suitable for high-speed riding.

·Race:High power, high top speed, moderate field weakening, suitable for high-speed competition.

·Boost:Full power, full top speed, violent acceleration, suitable for 0-100 km/h acceleration tests.

·Crawl:High-torque, limited-speed creeping mode, suitable for pushing a cart while walking.

·Gasoline-125:Slower acceleration paired with high top speed, designed for those who prefer the tactile sensation of a gasoline-powered vehicle while seeking exceptional speed.

·Strong-Eco:High power, aggressive acceleration, no field weakening for improved battery efficiency. Provides a strong and explosive feel, with a pronounced ejection effect; not suitable for beginners.

·Slushy:High torque, low power, delicate handling, suitable for particularly slippery but gentle slopes.

·!!MAX TORQ!!:Use with caution! Not for novices! Max torque unleashes the terrifying power of a performance beast.

③Parameter Introduction

Each mode features four adjustable parameters—Speed control, Traction control, Power blast (PB), and High speed torque compensation (HC)—along with two customizable feel curves for throttle response and electric braking. Users can either apply preset configurations from the official mode library or customize settings for optimal riding performance.

·Speed control

Sets the maximum speed for the current mode, corresponding to full throttle input. Lower settings refine throttle precision by narrowing the speed range per throttle rotation angle. Activating the field-weakening function (enabled above 50%) increases top speed but reduces motor efficiency and accelerates battery drain.

· Traction control

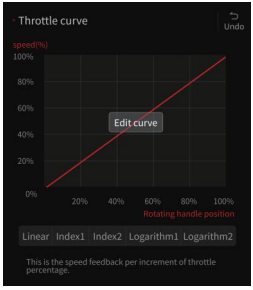
This parameter adjusts the wheel torque by setting the maximum motor phase current, which determines the motor's torque and power output. A higher phase current results in stronger acceleration at low speeds. For example, when the motor phase current is low, even at a high throttle input, speed changes remain smoother, providing a more comfortable riding experience. Conversely, a higher motor phase current delivers larger speed changes even with a small throttle input, resulting in a more aggressive riding sensation with a pronounced "pulling" or "jerking" effect.

V. APP Connection and Configuration

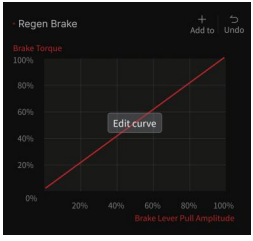
·Power Blast (PB)
This parameter adjusts the rate at which traction increases in response to throttle input . A higher PB value means traction builds up faster, providing greater torque for the same throttle input. This setting is ideal for steep climbs, sudden bursts of power, or navigating obstacles. Conversely, a lower PB value means traction builds up more gradually, resulting in lower torque for the same throttle input. This setting is better suited for conditions with poor traction where excessive force could result in wheel spin.

·High speed torque compensation (HC)
This parameter enhances traction during high-speed phases, specifically for executing wheelies (lifting the front wheel) or achieving stronger secondary acceleration. A higher HC value allows the rider to initiate wheelies more easily at higher speeds and increases the top speed. However, this comes at the cost of reduced linear control in the mid-to-high speed range, resulting in less precise handling.

·Throttle curve:Edit custom curves or select pre-existing system curves to configure the baseline feel of the throttle. The default curve is a linear curve, where the relationship between throttle input and speed is linear. This means that as the throttle is twisted, the speed changes uniformly, making it suitable for most riding scenarios. Users can also choose exponential or logarithmic curves based on their actual riding experience and preferences.



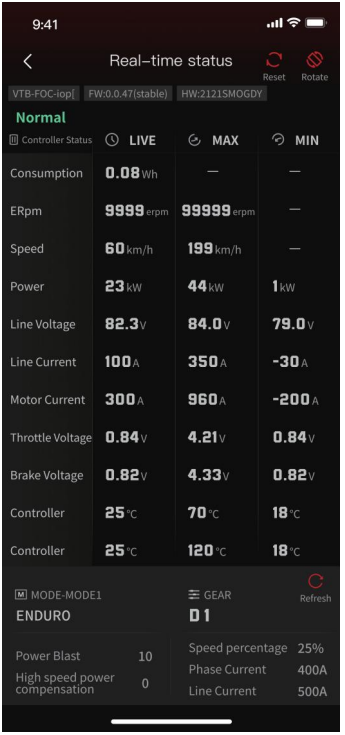
·Regen brake:Edit custom curves or select the default linear curve to configure the baseline feel of the regen brake . The regen brake curve enhances the braking force of the disc brake by leveraging motor drag. By fine-tuning the curve, users can align it with the disc brake for an optimal and precise braking feel.



V. APP Connection and Configuration

4.Real-Time Status Monitoring

·Users can view real-time status information of the bike through the personal "VTB" app, including the current power consumption, RPM (Revolutions Per Minute), speed, power, Line voltage, Line current, Phase current, throttle voltage, brake voltage, controller temperature, and motor temperature.
·Regularly check the bike's status to ensure driving safety and optimal performance.



V. APP Connection and Configuration

5.App Advanced Settings

1.Controller Bluetooth Password
Used for connecting to the bike controller, typically a four-digit code. Default is no password.

2.Maximum Regen Brake Torque
Used to enhance the braking performance of the regen brake; adjust as needed to increase braking force.

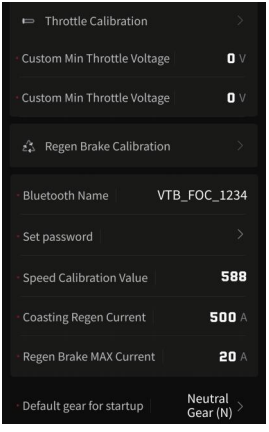
3.Default Gear on Start-Up
Normally defaults to Neutral (N) for standard riding. Can be set to Drive (D) for racing or special modes.

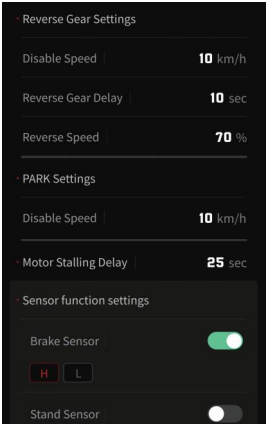
4.Reverse (R) Parameter Settings
Disable Speed: The maximum speed limit when switching to reverse (R), default is 10 km/h. Switching at higher speeds may damage the drivetrain and cause safety hazards.
Gear Shift Delay: The response delay when shifting to reverse (R). Adjust according to personal preference to ensure safe shifting.
Reverse Speed Limit: Set the maximum speed limit when reversing.

5.Parking Parameter Settings
Disable Speed: The maximum speed limit when switching to Park (P); default is 10 km/h. Switching at higher speeds may damage the drivetrain and cause safety hazards.
Stall Time: Set the time limit for motor stalling when parked.

6.Power-Off Protection Settings
Brake Power-Off Enable: The system will automatically cut motor power when the brake is applied.
Kickstand Power-Off Enable: The system will automatically cut motor power when the kickstand is down to prevent accidental motor start-up when parked, enhancing parking safety.
Tilt Power-Off Enable: The system will automatically cut motor power if the bike tilts to a certain angle.
H—High Level, L—Low Level.
Warning: Do not change the level settings.

7.Parameter Calibration
·Motor Calibration: Automatically detect and calibrate motor parameters to improve overall performance. Perform motor calibration after replacing the motor or if the performance is noticeably poor and riding feels rough.
·Throttle Calibration: Adjust throttle response to improve control accuracy. Perform calibration when replacing the throttle grip or if voltage offset occurs due to aging.
·Regen Brake Calibration: Adjust the linear response of the brake lever to improve braking accuracy. Perform calibration when replacing the brake lever, if voltage offset occurs due to aging, or if the brake feel is incorrect.
·Speed Calibration Value: Used for fine-tuning the displayed speed. Perform speed calibration if there is a change in tire size or transmission ratio.





4. Firmware Upgrade

Enjoy seamless system updates through continuous OTA service. Additionally, Vantusi offers select users the opportunity to participate in beta testing for new firmware. Interested users may contact the official tea m to secure a spot and experience the latest features.

Note

During the firmware upgrade process, ensure your phone remains close to the dashboard or controller and avoid moving the device. Follow the on-screen instructions and wait for the upgrade to complete. Controller updates typically take about 5 minutes when upgrading to the latest version. Dashboard updates require 1–3 minutes under normal circumstances; however, updating across multiple versions in a single session can take 1–2 hours. Please allocate adequate time for the upgrade accordingly.

https: //ventusbikes.com

Queenie Ke
Whatsapp:+8613530860114
Email: Queenie@ventusbikes.com

Shenzhen Ventus Technology Co.,LTD

Add: 2nd Floor, Building C, Baochengtai Jixiang Industrial Park, No. 348 Ainan Road, Longgang Street, Longgang District, Shenzhen