Green New Motivity

VOLTO™ ELECTRIC BICYCLE USER MANUAL

TD-Series (TUI / FALCON / ROBIN)

PLEASE READ CAREFULLY

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Safety Instructions

Thank you for purchasing a VOLTO Electric Bike. This electric bicycle features the most recent innovation in technology and applies to the AS/NZ standard. For safety reasons, it is most important that you read this User Guide BEFORE you operate the bike. Improper handling can reduce its riding performance and most importantly, pose danger to your safety and health!
NZEBIKES is continuously updating and innovating this product. The printed manual may therefore not always include the latest updates. However, we shall make sure that our online manual will always be up to date on www.volto.co.nz/support.

We want also encourage you to register your bike with your frame serial number. This allows us to help you finding your bike in case of theft, as we get contacted by the police when bikes are recovered.
To register just go to our Volto website and click on "Login".

Symbols

Please pay particular attention to information next to one of the symbols shown below as it can be very important for your personal safety.

WARNING
This symbol indicates that improper handling poses a risk to your health and safety

ATTENTION
This indicates that improper handling could damage components and make
void the warranty.

NOTE
Points out to useful tips

Introduction

You have decided in favour of a Pedelec (Pedal Electric Cycle) - a bicycle that is equipped with an electric motor to give you additional assistance when riding. With this bicycle you can make better progress in headwinds, when transporting heavy loads or on steep slopes.
You can select the level of power assistance required according to the weight of your load and/or the prevailing road conditions, the effectiveness of the power assistance depends on your pedal power and the level of assistance selected. Before switching on the electric assistance system, please read the chapter "Charging the battery". The battery must be fully charged before you go for a ride the first time.

Mode of operation and extent of electronic power assistance

As soon as you turn on the electric assistance system and begin pedalling or twisting the throttle, electronic power assistance is available. Depending on the selected assistance level the motor will add a certain amount of power to assist you. The more you pedal on your own the less power the motor has to add, which increases the all over range.
The pedal assistance does not measure your pedal effort, this means you can relax when being exhausted and let the motor take over most of the work. Just keep in mind that the battery will get sooner used up. An average rider can easily reach on flat tracks up to 80km out of the standard 16Ah battery.

Levels of support

There are currently four support levels:
1 = 30%, 2 = 50%, 3 = 70%, 4 = 100%
With higher support the motor will reach also a higher speed.

What comes with the bike?

- 240V mains charger
- LED handlebar mounted front light, battery operated
- A set of 2 keys for the battery and 2 keys for the battery frame lock

We recommend to mark the keys to better identify them as they look similar. Keep one pair safe in case you lose a key. We can provide blank keys for replacements. If both keys get lost the lock has to be replaced.

Components (TUI / FALCON)

1	Control Display	6	Battery
2	Throttle	7	Battery Switch
3	Gear Changer	8	Battery Frame Lock
4	Pedal Assist Sensor	9	Motor Power Connector
5	Controller Case		

Basic Safety Tips

Always pull the brakes and hold the handlebar firm and straight before taking off in order to make sure you keep control of the bike when power assistance is in action! NOTE that power assistance is triggered off IMMEDIATELY as soon as the crank moves slightly in riding direction. Also, keep in mind that the right hand half-throttle is active. By pulling one of the brakes the motor will be disengaged.

For your own road safety

- Always wear a suitable bike helmet
- Wear bright clothing or reflective elements to be seen better by other road users
- Wear shoes with a non-slip sole
- Wear close-fitting clothing on your legs or wear trouser clips
- Wear bicycle gloves

Ref (1)

How to use your charger

To charge the battery your Volto comes with a 3Ah fast chargers. Please do not use any other charger.

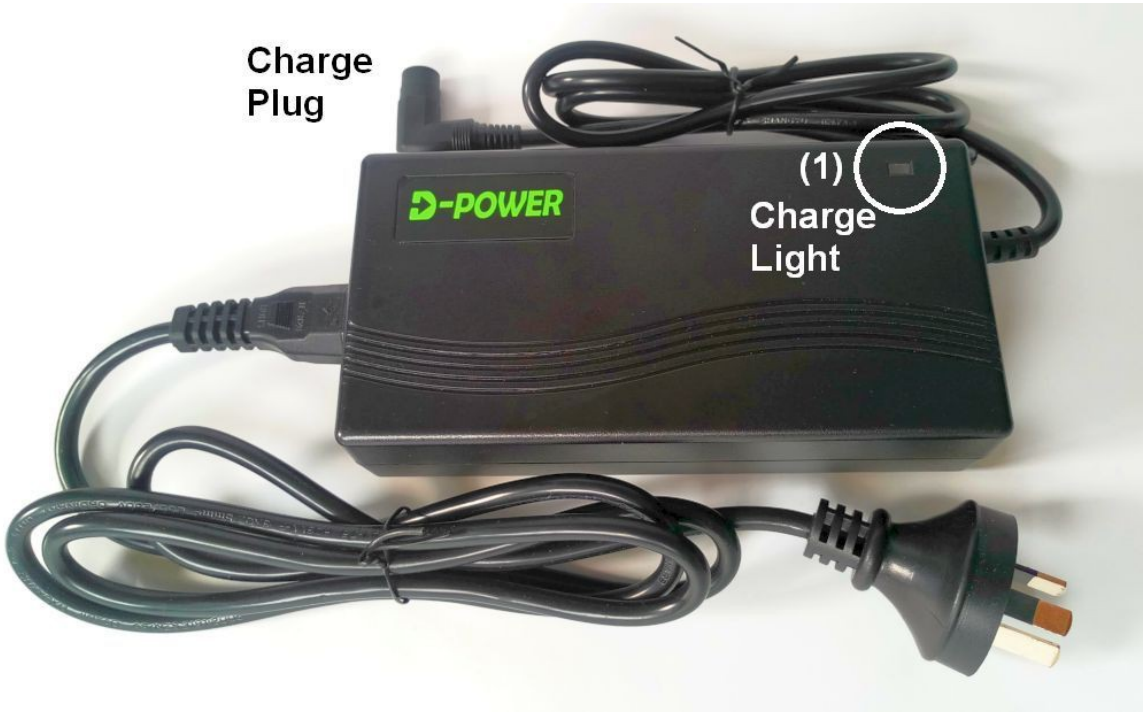
If you want to charge your battery from a car or motor home (12V systems), NZEBIKES or your retailer can supply a special charger called PowerBuddy for this purpose.

Before you first use the charger please read the following notes regarding safety carefully!

- Keep the charger away from children!
- In order to prevent any possible injury this charger should only be used for the original lithium battery which is supplied together with the Volto e-bike
- Any other battery is not compatible and risks to explode while charging, causing serious injury to people as well as damage to other equipment
- Using this charger for batteries not supplied by Volto could risk catching fire, provoke electric shock and/or cause serious injury
- Please make sure that the charger is always kept dry and does not get wet at any time.

Should there be an incidence of contact with water or any other liquid, make sure to unplug the charger immediately from the power socket and have it inspected by your dealer.
Make sure the charger is always placed on a flat surface when in use. Please

make sure that the charger is always unplugged and removed from the power socket when not in use.
Before using the charger, always make sure that the plug and the cables are not damaged.
Never connect a damaged cable or plug to the power socket. Never try to disassemble the charger. There are no serviceable parts in the charger.
Always unplug the charger before cleaning it. The charger should only be cleaned with a dry cloth. Never use a wet cloth, oil or any other liquid. Only use the original cable supplied with the charger.



The charger LED (1) indicates the battery status:

LED	STATUS
green	the battery is not connected
red	the battery is charging
green	the battery is charged, the charger has switched off

Before using your battery the first time, it has to be charged once over night for at least 12 hours.

Safety notes concerning the battery

- Keep the battery out of reach for children
- Never try to open the battery. Apart from this being dangerous, all warranty will be void
- Do not provoke a shortcut circuit with metal gadgets
- Remove the battery from the bike when transporting on an external bike rack
- Do not dip the battery in water or any other liquid
- Do not keep the battery close to heat or open fire
- A battery needs to be re-cycled after use, never throw it in an open fire as it could explode
- If the battery is damaged because it has been dropped somewhere or because of a biking accident, there might be a risk of an internal short-circuit
- Immediately stop using a damaged battery.

In order to maximise the use of this battery, please consider the following:
The battery will not charge when exposed to temperatures below +0°C or above +60°C. It is therefore recommended to keep the battery at room temperature before charging it.
The charger operates with a microcomputer system with automated control functions. It automatically stops charging when the battery is full. It cannot be damaged by overcharging.
None the less, we strongly recommend to always disconnect the power plug from the wall socket after the battery is charged as power surges, i.e. lightning, through the grid can damage the charger or battery electronics!
When storing the battery for a longer time period, (e.g. over winter) it is important to place surface in a dry place. The battery should be re-charged once every 3 month when it is not used. Negligence could lead to complete discharge of the battery and this would void the warranty.

The discharging of the battery is due to chemical processes which are taking place within the battery cells. How much a battery discharges depends on the time it has not been used and the temperature it has been exposed to. Thus, a re-charge every 3 month, when not in use, is essential.

Charging the battery

You may charge the battery on the bike or remove it to a more convenient place.

1. Flip the handle up and connect the charger plug to the battery
2. Connect the power cord to a mains socket

The charger will get warm while charging – do not cover while in use as it might cause a malfunction.

How to remove and insert the battery

1. Removal: Unplug the motor power plug and if the battery is locked, unlock the frame lock
2. Swivel the seat to the front and pull the battery with handle out of it's rail.
3. Insert: Slide the battery into the battery rail, secure it in the frame with the battery frame lock. Insert the motor power plug firmly.

A loose power plug can lead to power outages while riding and may damage the contacts.

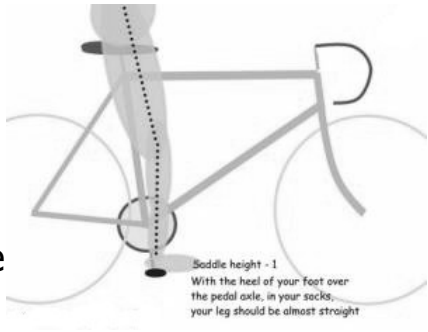
Before starting to ride

Adjust Seat height

Open the quick release lever at the seat clamp, adjust seat height and close the lever firmly. If the lever is too loose, open the lever again and turn the adjusting nut clockwise till you feel resistance. Now close lever again. It should close with noticeable resistance.

Never tighten the seat post if the maximum mark is visible, otherwise you can injure yourself or damage the seat post.

How to find the correct saddle height?



1. Sit on bike saddle
2. Try to reach pedal with your heel when it is in the bottom position. Your knee should be more or less fully straightened out
3. Place the ball of your foot on the centre of the pedal. If your knee is now slightly bend, the saddle height is correct

Adjusting the saddle angle

Best riding comfort is found when the saddle is horizontal, some riders prefer a slight forward angled seat.

Never angle a seat backwards as it can quickly lead to back pain or physical injuries

1. Loosen the clamping nut on one side anti-clockwise
2. Tilt the saddle to the required angle
3. Tighten the clamping nut clockwise. Make sure that the nut it tightened firmly (20 NM)

Adjust the stem and handlebar

The models TUI and FALCON allow an adjustment of the handlebar in terms of angle, while the ROBIN has a height adjustable stem.
To adjust the angle, which will raise or lower the handlebar and changes also the distance to the rider you have to loosen the 6mm Allen Key screw. When the lock plate is loose enough the handlebar angle can be adjusted. Re-tighten the screw.
Adjust the tilt of the handlebar by opening the handlebar clamp screw.

Check tire pressure

It is very important to maintain the correct tire pressure. Too low pressure will decrease the range and can lead to rim or tire damages when riding over edges. For FALCON and TUI the recommended tire pressure is 40 psi, for ROBIN 50 psi.

Operation

- Turn the power on with the battery key. Turn the display on by pushing the (I) button.
- Select the desired assistance level with the arrow keys. Start riding.
- Use the throttle as desired to add additional power to the selected assistance.
- When finished riding turn the battery power off.

Display

The display shows the battery level with 4 LEDs. Each level is about 25% of power, when the battery reaches the last 10% the remaining LED starts to flash. In this stage the controller or battery might turn off when a higher load is applied, i.e. riding up a hill.
The display turns off automatically after 10 min. To manually turn it off keep the (I) button pushed for 2 seconds.

Walk assistance: you can activate the motor to support you pushing the bike up a hill. Press and keep depressed the UP arrow button. After 2 seconds the motor will start with a maximum speed of 6kph.

This mode is not supposed to be used while riding the bike

Throttle

The right hand side half-throttle allows the rider to add power to the selected assistance level. This can be useful when starting off or to give you an extra boost when riding up a hill.

Throttle-only mode: by deactivating the pedal-assist sensor you may choose just to use the throttle to add electric power when required. To disable pedal-assist you may slide the magnetic disc on the crank axle away from the sensor. To re-activate just push the disc back in it's position. The optimal distance to the sensor is about 2-3mm.

Gears

Only change gears while pedalling otherwise the derailleur might get damaged

If you have to change gears, i.e. to start off in first gear, lift the rear wheel using the side stand and turn the crank while changing the gears.
As a rule of thumb gears on a bike are changed and used similar to a car with a manual gearbox.
You will start off in 1st gear, on a flat road you will choose gear 3 or 4 to pedal along. Uphill go back to 2 or for steeper hills gear 1. If you ride faster or downhill choose higher gears.
The assistance level chosen on the display will assist you up to a certain speed. Choose assistance level and gear according to your needs and riding style. Watch you crank revelations, if you have the feeling you have to push too hard at too low revelations, change to a lower gear. If you pedal very fast with less effort, choose a high gear or reduce the assistance level.

When you intend to stop it is good practise to change the gear back to 1st gear so you may start off without any problems. This can easily be done while braking and slowly pedalling as the motor will not push you further.

Brakes

We recommend always to use both brakes at the same time – this allows the rider to take best control over the braking process without stressing the front or rear brake. To brake efficiently, your front brake is there to stop you and the back brake is there to shave off speed. Roughly 70-80% of your stopping power comes from the front brake. Leaving 20-30% for the back brake.
As soon as one of the brakes gets engaged the motor support will stop.

To go around narrow corners by just using the riders pedalling power pull one of the brake levers only slightly without actually engaging the brake

Maintenance

Your Volto E-Bike needs regular maintenance as any other normal push bike. All bike shops can help you with these maintenance steps.
There is no maintenance necessary on the electrical components.

Brakes

Adjusting methods for braking systems
Examine the braking system frequently to ensure its reliability. Please identify your brake system as follows for any maintenance

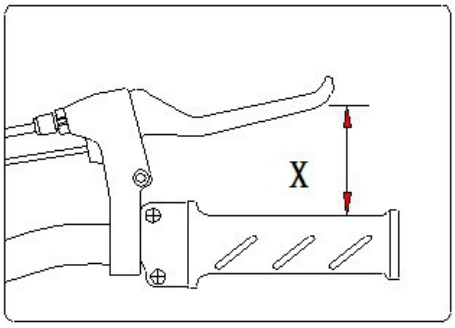
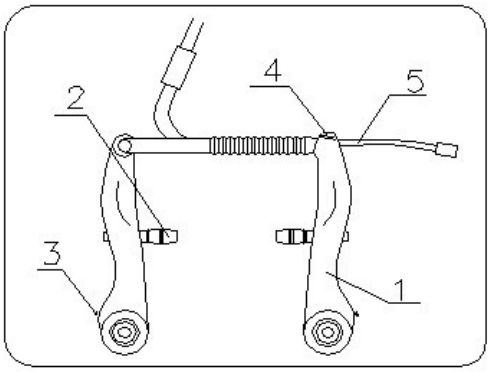


Fig 1

Adjusting the front rim brake (only Folding Bike)



1. Brake arm
2.Brake block
3.Spring adjusting screw
4. Braking cable seat
5.Braking cable

Check the right brake lever as shown in Fig 1. It should reach full braking when its stroke reaches ½ X.

1. Check the right brake lever as shown in Fig 1. It should reach full braking when its stroke reaches ½ X.
2. Loosen the screw on the braking cable seat (4). Then tighten or loosen the braking cable, enabling the average stroke between the two brake blocks (2) and the rims to approximate 1.5~2mm.
3. Replace the brake pads, when there are no grooves in the rubber visible any more

Adjust the rear brake (Dia Compe Roller Brake)

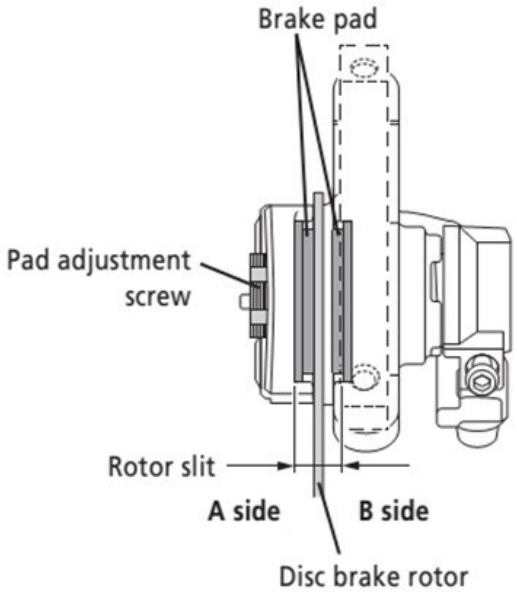
1. Check the left brake lever as in Fig 1 shown
2. Use the cable adjuster (Fig 2) at the brake lever to tighten the cable or if necessary use cable adjuster at the brake. Make sure that the brake is not always engaged by tightening the cable too far

Do not re-grease the brake on your own. Using the wrong grease or too much grease can cause a failure of the brake. Always ask your local Volto service partner if further maintenance is required.

Adjust the front disc brake (TUI and FALCON)

Check the right brake lever as shown in Fig 1.

- Use the cable adjuster (Fig 2) at the brake lever to tighten the cable Make sure that the distance between brake pad A and B to the discs is still equal
- The brake pads can be used as long as their thickness is 0.5 mm or more
- Adjust clearances A and B between the disc brake rotor and brake pads to be equal. Adjust each clearance to between 0.2 mm and 0.4 mm
- Adjust clearances when the brake pads are worn down. Make sure to adjust both clearances A and B concurrently



Adjusting only one of the clearances A or B may cause the following problems:

- Contact between the pads and the disc brake rotor may occur during operations other than braking
- Sufficient braking force may not be obtained when the clearance becomes much greater on one side
- The disc brake rotor contacts the calipers during braking

For further adjustments and maintenance please refer to the Shimano Maintenance Manual.

Cable adjuster at brake levers

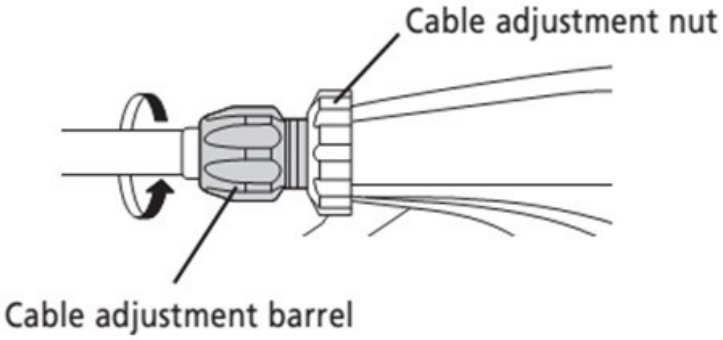
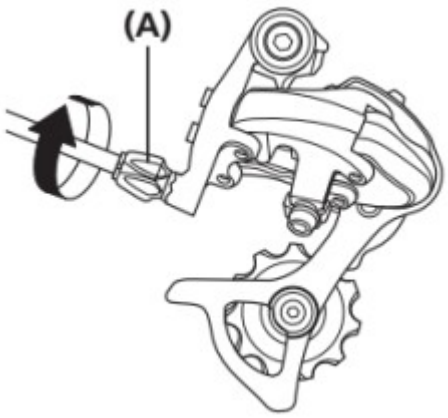


Fig 2

Gears

Our bikes use a solid and easy to maintain Shimano Tourney gear system.
It can happen after a while that gears do not perfectly change any more or you experience a rattling noise while pedalling. This is normal due to the nature of the used control wire hulls which get compressed over time. To re-adjust it is usually enough to slightly tighten the gear wire.
For the rear derailleur turn (A) clockwise while turning the pedals till the rattle goes away – otherwise turn counter-clockwise.



Safety points

We recommend a 6 month interval service or every 1000 km.

Important checkpoints are:

- front axle nuts
- headset
- stem clamp
- bottom bracket and crank screw
- rear wheel axles nuts
- seat post clamp
- brake caliper screws
- spoke tension

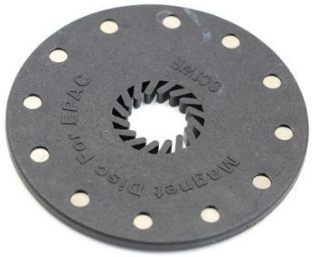
Spoke tension has to be checked on a regular interval. Failing can cause spoke breakage and will void the warranty

Repairing a puncture

With the motor in the rear wheel it is more complex to replace a tire or tube. In case of a puncture we first recommended to check if the puncture can be repaired using a patch.

1. Lay bike on the derailleur side (protected)
2. Pull tire of rim
3. Identify puncture in tube and check tire for any sharp objects to be removed
4. If tube is still repairable apply patch
5. Refit and pump up tire

Trouble shooting

Problem	Resolution
While riding the motor surges (turns on and off in an interval)	 Check position of magentic disc on the crank axle. Distance to sensor should be 2-3mm.
Display is turned on, but motor won't start (throttle or pedal-assist)	1. Check brake levers – if one of the brake levers is not in it's initial position the motor won't work. 2. Check motor plug at rear stay. Unplug once and plug back in (Allign arrows! Needs some force!) 3. Take bike to your retailer for further checks.
Battery is turned on but display won't turn on	1. Check if battery power plug is plugged in neatly 2. If possible measure voltage at the battery socket (left and right pin). If no voltage can be measured, take battery to your retailer.
Charger is plugged in, but LED stays green	Battery fuse fault, please take battery to your retailer
While riding the motor stops and only one battery LED stays on. Function recovers after having stopped.	Controller signals an overload situation. Reduce load or amount of support.
While riding uphill motor stops.	Controller might get overheated on long uphill rides. Wait till controller has cooled down, function will recover. Reduce load or amount of support

Glossary

BMS

BMS is an electronic circuit for battery monitoring. It increases a battery pack's safety by making sure that all cells are operated within the permitted voltage range only. When current is too high, temperature is too high or one line of batteries inside the battery is outside the permitted voltage range the charge output will be switched off. This avoids total discharge of the battery during normal operation. An integrated balancer insures that any differences in voltage between single cells are equalised. In case of a problem with the charging device the BMS makes sure that the battery cannot be overcharged. A capacity gauge maybe included to display the remaining capacity.

Controller

The controller is the heart of any electric bicycle. It has the power electronics to drive the motor and a microprocessor. The controller processes all input signals coming from the different sensors and it talks to the display on the handlebar. The microprocessor runs the firmware, which is the piece of software telling the controller what to do. Firmware updates can be applied to improve or add functions.

Display

The display is usually mounted to the handlebar and allows the rider to readout vital information about the e-bike system and control the functions in the controller. There are different kind of controllers with LED or LCD interface.

Hall sensor

Hall sensors are used in motors, cadence sensors, brake switches and power throttles. Inside the motor they determine the motor direction and submit it to the controller so the motor will turn in the right direction right at the start. Inside the PAS they detect if the magnet disc is rotating. Inside the power throttle they measure how far the throttle is rotated. Hall sensor can be of the analogue or digital kind. Functional principal: When hall sensor are passing by a magnetic field they emit an initial voltage, which is proportional to the product of magnetic field strength and current (Hall Effect). They are named after their inventor Edwin Hall.

Pedal Assist Sensor (PAS)

In an electric bicycle the PAS measures if the crank is moving in riding direction. This information will be passed on the controller which then activates the motor to support the rider. The PAS can distinguish between forwards and backwards movements of the crank.

References

Ref (1): Ministry of Health NZ, Website

Notes:

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