



**evinci™ ELECTRIC BICYCLE
USER MANUAL**

infinity Series



PLEASE READ CAREFULLY



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Safety Instructions

Thank you for purchasing an electric bike from NZEBIKES. Your **infinity** mountain bike 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 pushing 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 amount of support is also proportional to the force pushed into the pedals thanks to the torque sensor integrated into the crank axle.

An average rider can easily reach on flat tracks up to 80km out of the standard 13Ah battery.

Levels of support

There are currently five support levels:

1 = 20%, 2 = 40%, 3 = 60%, 4 = 80%, 5 = 100%

With higher support the motor will reach also a higher speed.

What comes with the bike?

- 240V mains charger

Optional accessories

- Rear carrier: a light weight and sturdy alloy carrier suitable for pannier bags
- Mud guards
- PowerBuddy: a 12V direct charger. Allows to charge your battery through your car or RV battery without an additional inverter.

Components



1	LCD Display	5	Battery Charge Port
2	Control Buttons	6	Battery Lock
3	Thumb-Throttle	7	Controller Case
4	Torque Sensor	8	Suspension Damper Control

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! Also, keep in mind that the left hand thumb-throttle is active.

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

Your **infinity** comes with a 3Ah quick charger to charge your battery. Please do not use any other charger.

The typical time to charge the standard 13Ah battery if it is completely empty is about 5 hours.



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 use the charger the first time 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 **infinity** 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.

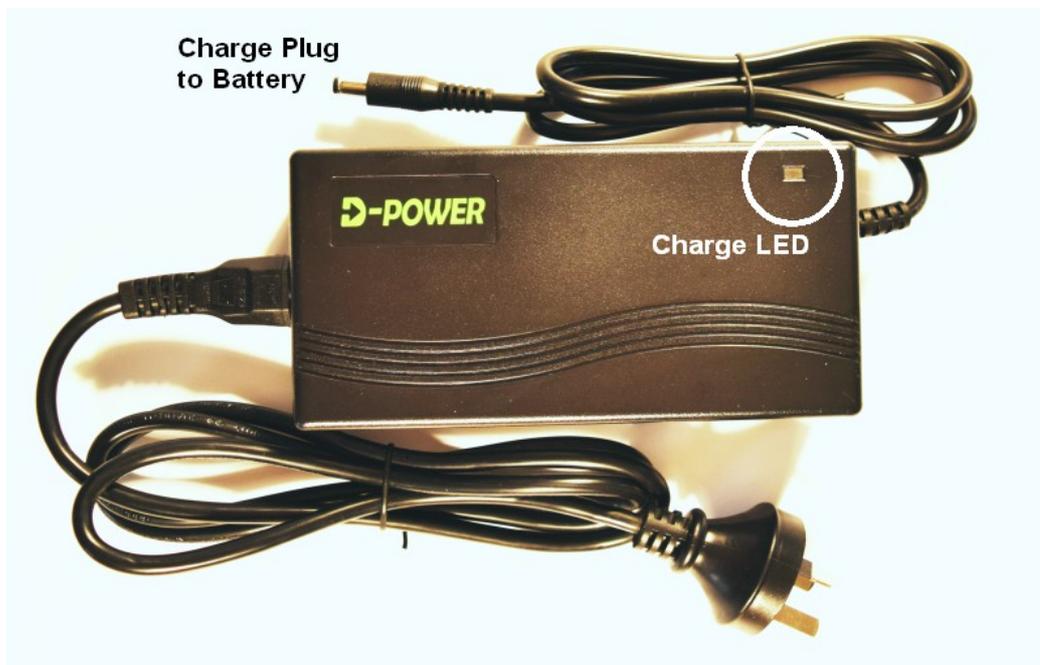
Should there be an incidence of contact with water or any other liquid, make sure to unplug the charger immediately from the power socket and have it inspected by your dealer.

Please make sure the charger is always placed on a flat surface when in use. Also 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 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 $+0^{\circ}\text{C}$ or above $+60^{\circ}\text{C}$. 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. Open the plug cover at the right side of the battery (#5)
2. Connect charger cord to battery
3. 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: unlock the battery lock at the left side of the battery
2. Slide battery upwards and then lift it out of the rail
3. Insert: Slide the battery into the battery rail, secure it in the frame with the battery lock

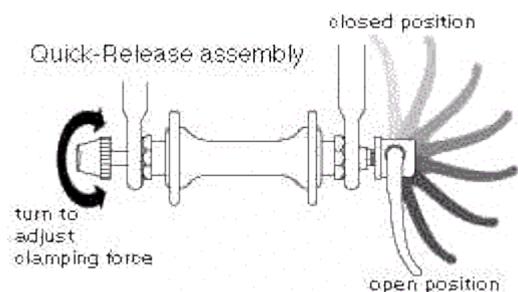
Before starting to ride

Mount or dismount front wheel

For an easy transport you may remove the front wheel using the quick release at the front wheel axle.

To remove the wheel open the lever to release the pressure. Now hold the lever and turn the nut on the other side about 8-9 times – do not remove the nut! You should be now able to lift the wheel out of the fork.

To mount the wheel repeat procedure the other way round. Hold the lever pointing parallel to the fork in the open position (downwards), turn the nut till you feel a slight resistance. Try to close lever – if it goes too hard undo the nut a bit.



Before every ride make sure the quick release is tightened properly. To fail so can lead to serious injuries!

Adjust seat height

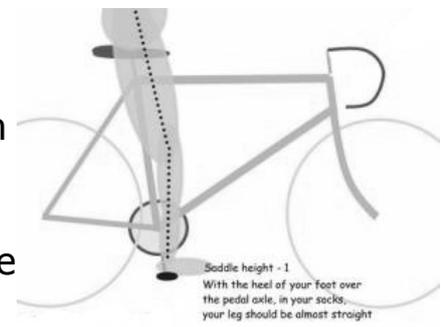
Open the quick release lever at the seat clamp, adjust seat height and close the lever firmly. If the lever is too loose, open the lever again and turn the adjusting nut clockwise till you feel resistance. Now close lever again. It should close with noticeable resistance.



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 screw anti-clockwise
2. Tilt the saddle to the required angle
3. Tighten the clamping screw clockwise. Make sure that the screw is tightened firmly (20 NM)



Adjust the stem and handlebar

The angle of the stem can be adjusted by opening the 6mm Allen Key screw at the right side of the stem. Do



not remove the screw! There are two clamp plates, as soon as both are release you may adjust the angle. Re-tighten properly!



Adjust the tilt of the handlebar by opening two of the handlebar clamp screws (upper or lower, 5mm Allen Key).

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 kerbs. The recommended tire pressure is 40 psi. For muddy undergrounds the tire pressure can be reduced to improve traction.

Suspension fork

Your **infinity** mountain bike is equipped with a high performance air suspension. This fork allows the rider to adjust the suspension to their personal riding style and terrain.



The right side lever allows to adjust the damping of the oil cartridge. If the lever is turned clock wise the damping gets softer – turned to the left it will get harder.



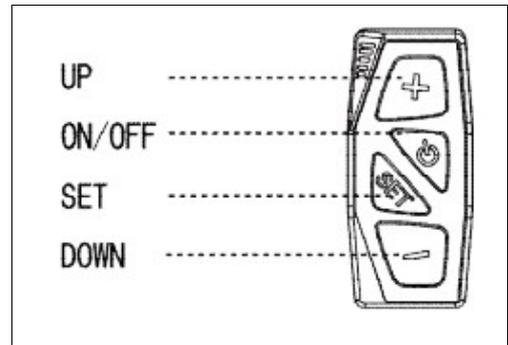
The pre-load of the air-cartridge can be adjusted on the left side by adding or releasing air pressure. A special pump is required for this purpose – your local retailer can help you with this. The pre load should be set according to the riders weight.

Compression Guideline

When going uphill it is usually better to turn the knob to the maximum left to prevent fork pumping. For slow and bumpy rides use a softer setting – for fast rides which need good brake control choose a harder setting to prevent brake dive.

Operation

- Turn the display on by pushing the (I) button
- Select the desired assistance level with the UP or DOWN keys. Start riding.
- Use the throttle as desired to add additional power to the selected assistance (the throttle does only add power according the selected level, this is a safety measure)
- When finished riding press the (I) button for 3 sec to turn the system off (it will also turn off after 5 min when not used)



Display

BMS (Battery Management System)

It shows the real voltage of the battery. The range is between 41.8V for a full battery, down to about ~32V for an empty battery.

The display also shows the battery level with 5 segments. Each level is about 20% of power, when the battery reaches the last 10% the battery frame 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.

POWER DISPLAY:



Above the Mode are 6 segments showing how much current the motor is drawing from the controller. Each segment stands for 2A, all segments mean 12A or higher.

This allows the rider to see how efficient he or she is riding, less current means the battery charge will last longer.

MODE: Not used for this setup.

KM/H: shows your current riding speed

PAS: your selected level of assistance. 0 = no support.

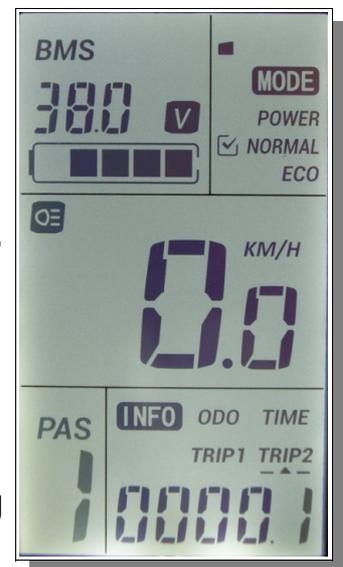
INFO: Can be toggled with the SET key. Shows ODO, trip time and two trip distances.

TRIP1: get accumulated till manual reset or resets when riding more than 500km. To manually reset push the SET key for 2 sec. Push the DOWN key once. Push SET key for 2 sec.

TRIP2: displays the last driving distance for 30 s after turning on the display, then resets automatically and start to record the current distance.

TIME: The riding time parameter is automatically reset after shut down.

BACKLIGHT: by pushing the On/Off button the display backlight can be turned on and off.



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



Walk assistance is not supposed to be used while riding the bike

Throttle

The left hand side thumb-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.

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 2st gear, on a flat road you will choose gear 6 or 7 to pedal along. Uphill go back to 3 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 your crank revolutions, if you have the feeling you have to push too hard at too low revolutions, change to a lower gear. If you pedal very fast with less effort, choose a higher gear or reduce the assistance level.



When you intend to stop it is good practise to change the gear back to a low 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.



Please note that this bicycles uses high performance hydraulic brakes with no special motor cut-out. When going around narrow corners adjust the power support to prevent unexpected high acceleration.

Maintenance

Your **infinity** 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

This bikes uses hydraulic brakes which are self adjusting. If you feel that the brake force gets lower or the way you have to press the brake levers exceed 50% of X (Fig 1) most likely the braking pads have to be replaced. Please see your local bike shop.

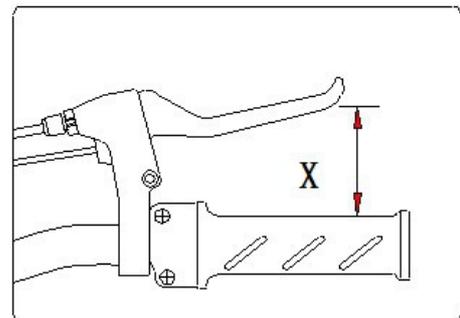
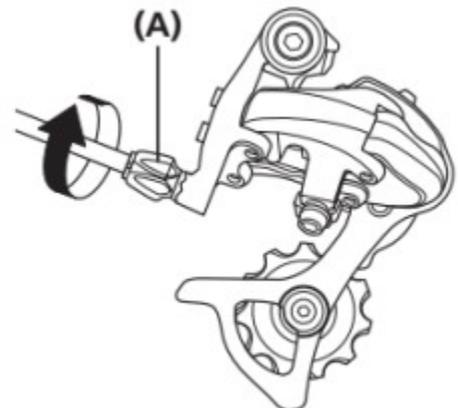


Fig 1

Gears

Our **infinity** bike uses a solid and easy to maintain Shimano Deore 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 can 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:

- Quick release front axle
- 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 left side side
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

To remove the rear wheel, first unplug the motor cable at the right side of the chain stay. When assembling make sure the arrows on the plugs are aligned and the plug is entirely plugged in. If you get Error 8 on the display, unplug and try again.

Trouble shooting

Problem	Resolution
Display is turned on, but motor won't start (throttle or pedal-assist) Display shows error code 8	<ol style="list-style-type: none">1. Check motor plug at rear stay. Unplug once and plug back in (Align arrows! Needs some force!)2. Take bike to your retailer for further checks.
Battery is charged but display won't turn on	<ol style="list-style-type: none">1. Check plug going from display to frame harness2. 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	Try to use other charger otherwise it might be a battery fuse fault, please take battery to your retailer

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.

Torque Sensor

The torque sensor measures the force generated by the rider when pushing into the pedals. Our sensor measures values between 1 to 80kg and applies motor support according to the selected PAS level.

References

Ref (1): Ministry of Health NZ, Website

Notes:

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