Rear Drive eBike
Assembly Instructions

Aug 2024



The most recent version of the manual is always available online at cyclotricity.com.

Thank you for choosing to build a CycloTricity project

By completing the remaining 30% of the build, you save hundreds of pounds on your eBike purchase. It's also a lot of fun!

The product is delivered in separate boxes. One box containing a partly built bicycle, and the other boxes containing the electrical parts.
For the purposes of this guide, the electrical parts will be referred to as "eKit".

Happy e-biking!

Disclaimer

The Cyclotricity eKit is supplied as a set of do-it-yourself parts for the user to install on a bicycle. Because this kit is installed, maintained and operated by the purchaser, Cyclotricity disclaims any responsibility for injury, damage or any other consequences arising from the use of this product.

The provided instructions should be considered as general guidelines only. If you do not have the mechanical ability to correctly and safely install this electric bicycle kit, you should obtain the services of a professional bicycle shop or other qualified technician.

Installation and use of this e-bike will create an electric motor vehicle that has exposed moving parts, electrical connections and high powered batteries. Any or all of these components can be dangerous!

The purchaser is required to ensure their vehicle will remain compliant with local laws and regulations and is wholly responsible for any legal implications resulting from using this product.

Introduction

Chapter 1 - Before you start

The best way to understand how your eKit works is to connect all the parts together and test them before you mount them on your bicycle. By doing this, you will learn how to wire everything correctly and you'll have more clarity during the assembly process.

This will also help with any troubleshooting before you spend time assembling everything on your bicycle. So let's get started!

1. Locate the **Controller** inside your eKit box and place it in the center of your working area.

   The **Controller** is the brain of your eKit. All components must connect directly to it.

2. Next locate the **System-Cable** and the **Motor-Cable** and connect them to the **Controller**.

System-Cable
(Connect the stem of this cable to the **Controller**, not the 4 branches)

Motor-Cable
(The number of pins may vary depending on the motor supplied)

Don’t worry, these connections are uniquely shaped, so you cannot go wrong.

Some cables have arrows on the connections. If so, make sure the arrows are aligned.

Push the connections firmly all the way in.

3. Connect the **Motor** to the **Motor-Cable**

- Your motor may look slightly different depending on your bike model.
- Remove the protective cover.
- Connect the **Motor** to the other end of the **Motor-Cable**.
- Ensure the arrows are aligned and push the connections all the way in firmly.

➢ The **Motor** should now be connected to the **Controller** via the **Motor-Cable**.

4. If you ordered a **Throttle,** connect it to the **System-Cable**

The **System-Cable** splits into 4 branches. The Yellow is for the **Throttle**.

Throttle (Yours may look slightly different)

Match the **Throttle** to the Yellow branch of the **System-Cable**.

Align the arrows and push them all the way in.

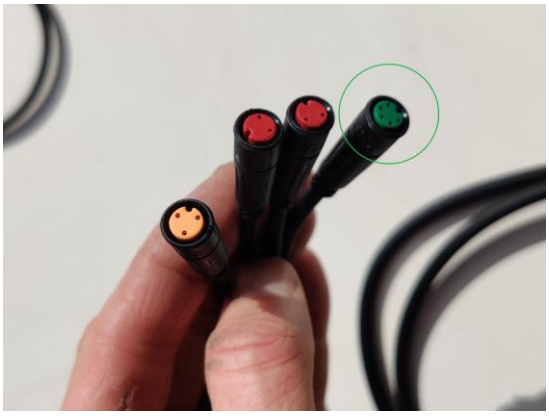
5. Connect the **E-brakes** to the **System-Cable**

The red branches are for **e-brakes**.

E-brakes
(Yours may already be installed on your bicycle handlebars)

Connect the **e-brakes** to any of the Red branches. Right or Left is irrelevant.

6. Connect the **Display** to the **System-Cable**

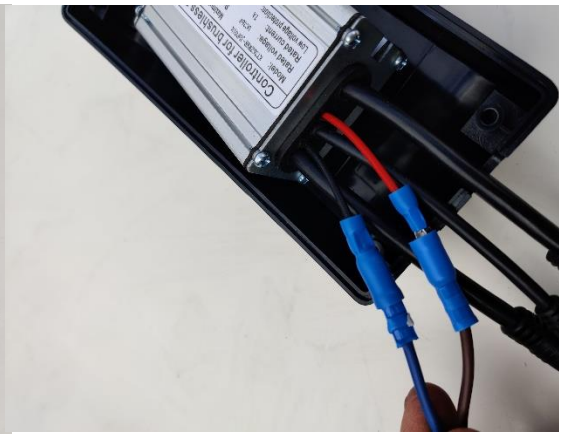


The green branch is for the **Display**

LCD Display

7. Connect the **Battery** to the **Controller**

Battery



Controller
Insert the bullet connectors to the corresponding ones on the **Controller**. Ensure the battery is switched off first.

8. Connect the **Pedal Assistance System** (Optional) to the **Controller**

PAS

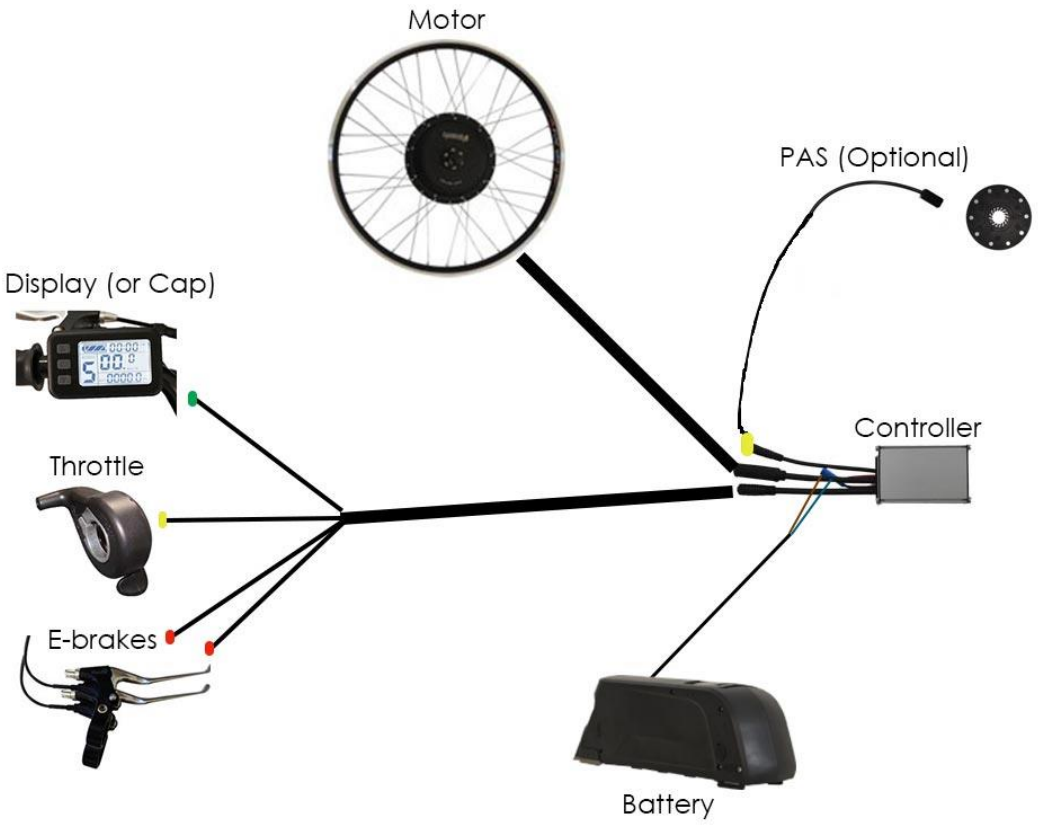
The **Pedal Assistance System** may already be installed on your bicycle's bottom bracket.

Controller

The yellow connection on the controller is for the **PAS**. It may be awkward to connect it to your bike at this stage, so it's okay to leave this connection bare for now.

9. Review the connections

By now, if you have done the previous steps correctly, your eKit should have been wired according to the following diagram:



10. First Test

This is the exciting part! We'll do a first test to verify that power flows through the system:

- Switch the battery on using the ON/OFF button on the battery.
- Switch the Display on by pressing and holding the ON/OFF button.
  (If it does not come on, please charge the battery).

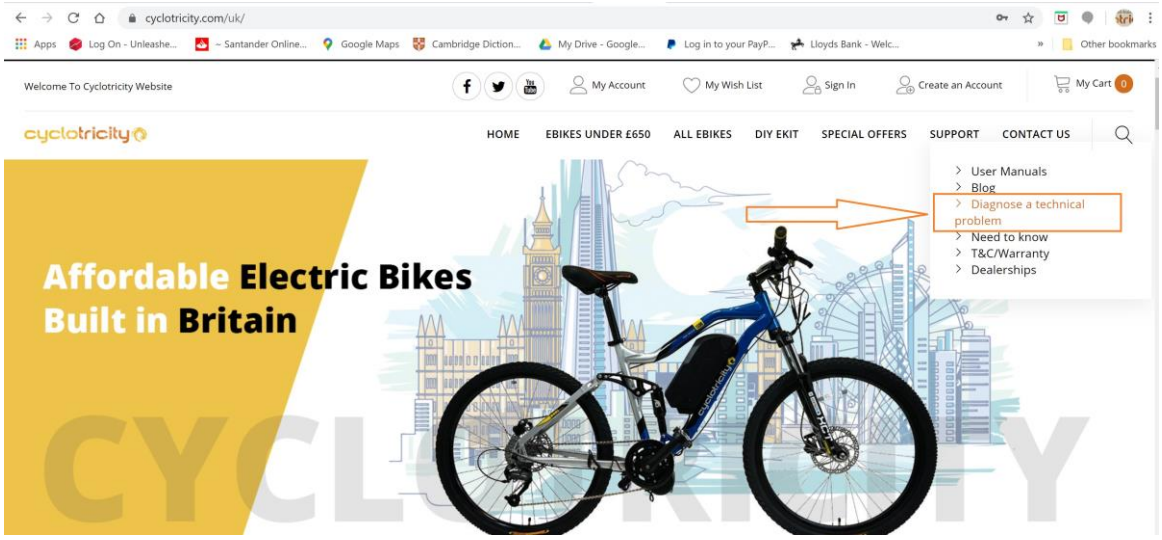
WARNING! Be extremely careful with the following step:
As soon as you press the Throttle, the shaft of the motor will spin! Doing this while the motor is resting on the ground could damage the shaft and the cable that goes through it.

- Press the Throttle for a milli-second. I.e. press the throttle and release it IMMEDIATELY! If you hear the motor reacting, then Bingo! This means power is flowing and you have completed the first part of this project. Great job!
    - If you do not have a throttle, you can achieve the same effect by pressing and holding the DOWN button on the display. Hold it for a few seconds until the motor reacts.
    - If the motor doesn't react, unplug the brake levers and try again.

Chapter 2 - We are here for you!

Lost in the instructions? Things didn't work? Missing parts? **Let us know!**

- You can contact us via our website cyclotricity.com
- Or for urgent troubleshooting, we have created an interactive diagnosis tool for you to tackle any issues like a pro! Try it out now: https://www.cyclotricity.com/uk/self-diagnosis



Assembly

Now that you have learnt how to power your eKit, it is time to disconnect all the parts so you can mount them on your bicycle.

Remember, these instructions are a general guide, so be prepared to improvise and do your own tweaks if necessary.

This is a DIY project after all!

Chapter 3 - Tools

We recommend you buy a bike toolset from the various sellers online before attempting the assembly. Although the following tools should be sufficient in most cases:

- Adjustable wrench
- A set of Allen keys
- Screw drivers
  (Both flat and crossed)
- Lubricant material
- Zip ties
- Pump
- Freewheel remover tool

Chapter 4 - Mounting the Rear Hub Motor

1. Start by turning your bike upside down so it is resting on the saddle and handlebars.

2. Add the protection tape, air-tube and tyre unto the motor-wheel.

(This step is best described visually. If you haven't installed a tube/tyre on your bike before, you are recommended to watch one of the many video tutorials online).

3. Mount the brake disc onto the motor.

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4. Mount the Freewheel

- Mounting the freewheel can be done by hand without any specialist tools. However, you won't be able to remove it unless you have a freewheel remover tool that looks like the image to the right.

You are recommended to keep a Freewheel Remover as part of your toolset for future maintenance.

5. Freewheel alignment

Each bicycle model is different. Depending on the frame geometry, the type of freewheel and derailleur you have, you may end up with slight misalignments. Adding spacers before and after the freewheel may be necessary, but not always. Trial and error is the only way to perfect this part of the project.

- A common issue is that your derailleur rub against the motor when you try to shift to the biggest cogs.

An easy workaround is to add a spacer between the motor and the freewheel.
This is not always necessary. You must make this determination by trial and error.

The thickness of the spacer depends on how you have aligned your derailleur. Start by adding the freewheel without a spacer for now.
If you discover later that your derailleur is unable to reach the large cogs of your freewheel, you can then experiment with spacers until you achieve perfect alignment.

6. Lubricate the freewheel

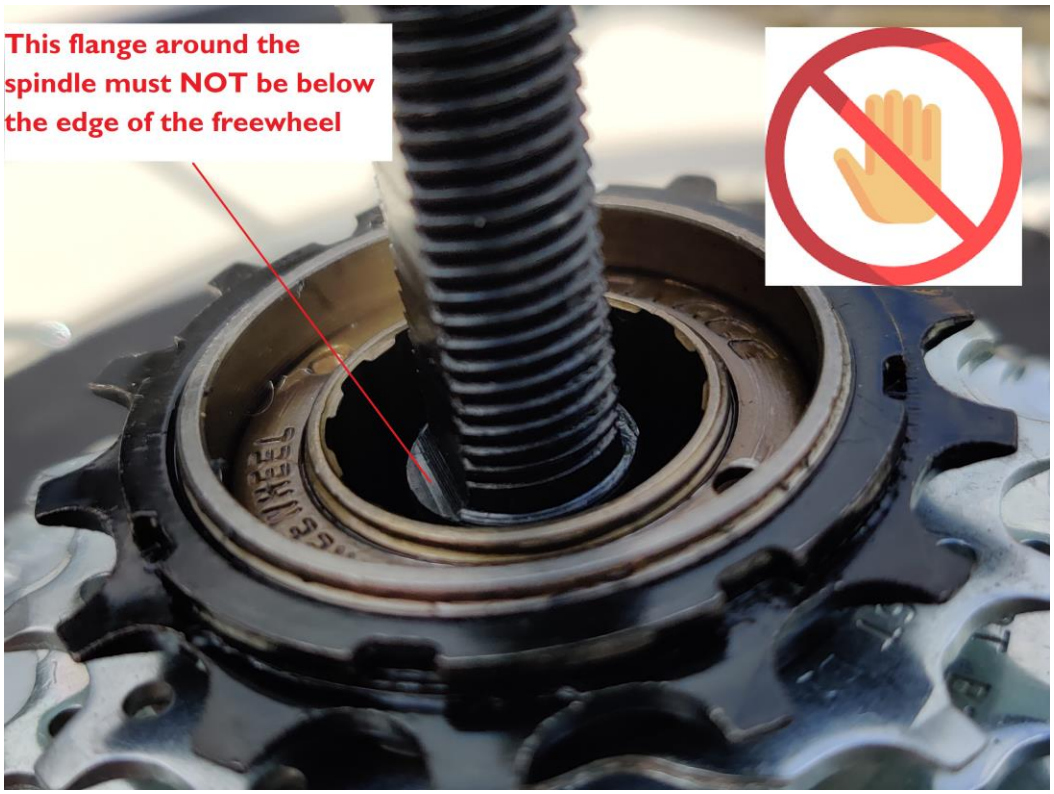
Before fitting the freewheel on the motor, make sure the threads are cleaned and greased.

- Lubricating the threads prevents the metal from ceasing. This makes it much easier to remove the freewheel later to experiment with spacers if needed.

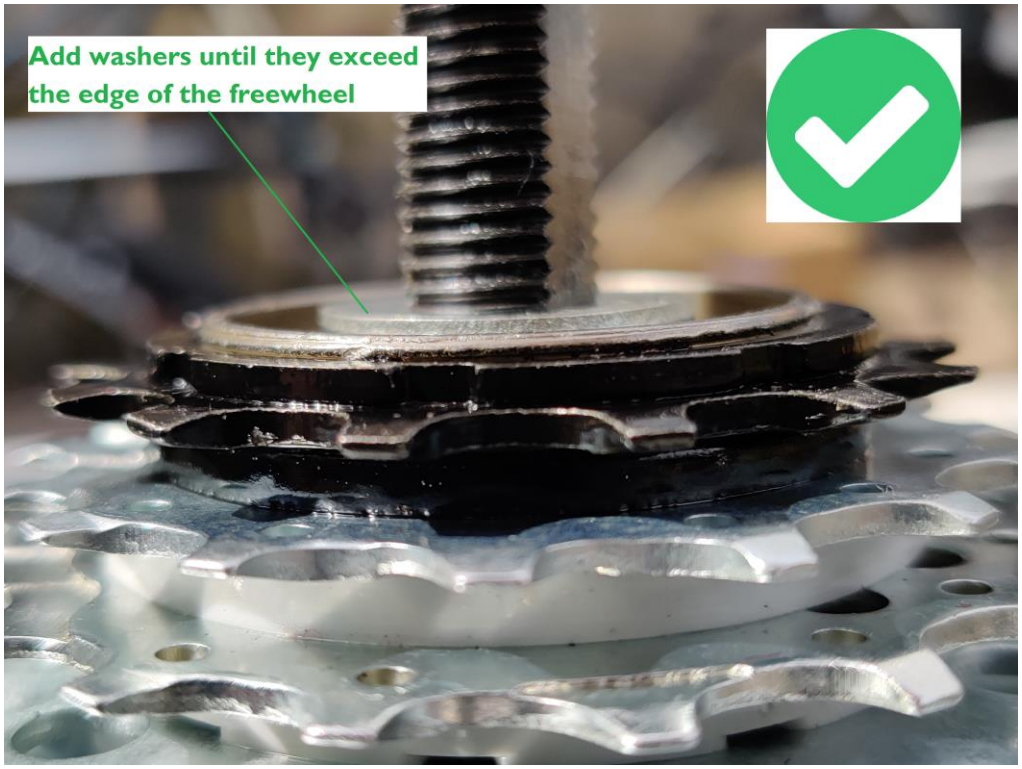
7. Now, fit the freewheel on the threaded part of the motor like so:



The Spindle of the motor has a flange. This must not be below the edge of the freewheel.

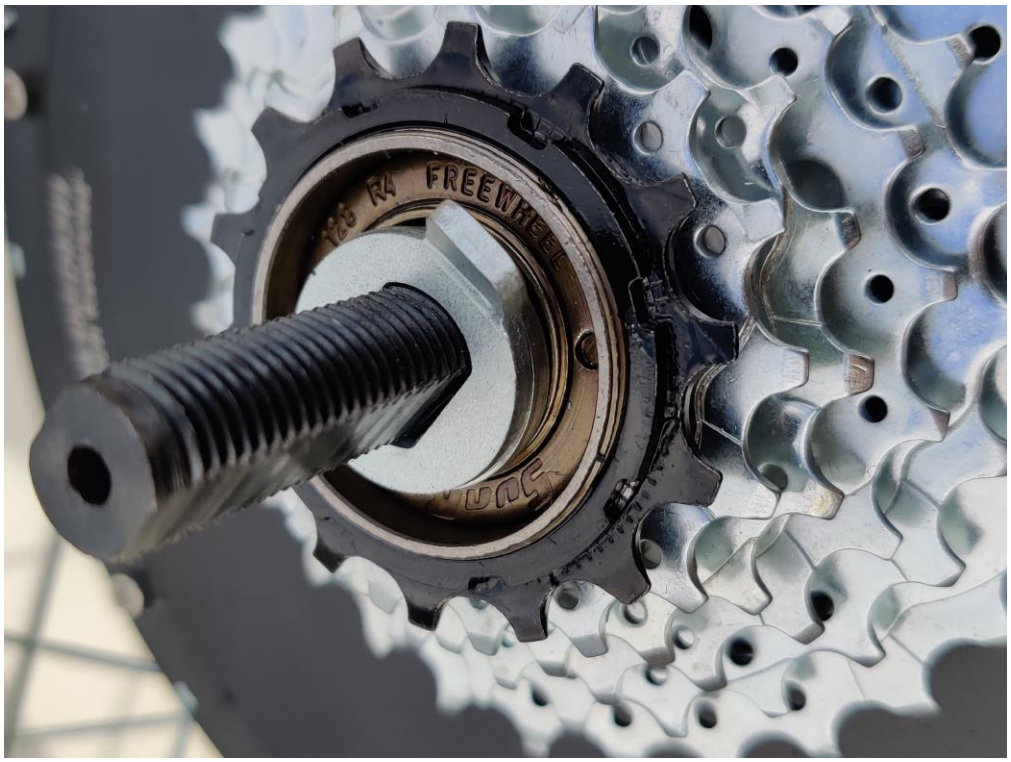


- This is likely to happen if you have a spacer behind the freewheel. It may also happen if your freewheel has 8 or more cogs (as is the case with The Beast e-bike).
  In which case, you must add washers (spacers) on the flange like so:

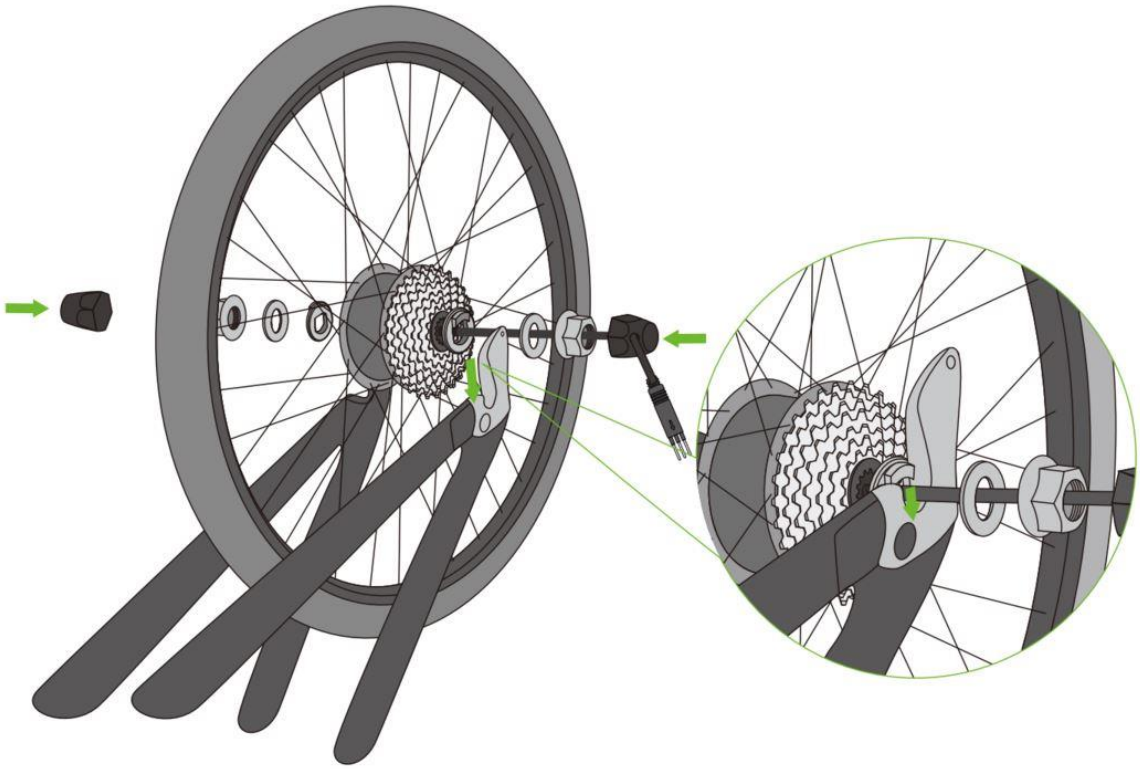


You may ‘pancake’ one washer on top of the other until they exceed the edge of the freewheel. This is to prevent the fork drop-outs from rubbing against the freewheel.

8. Add the torque-washer



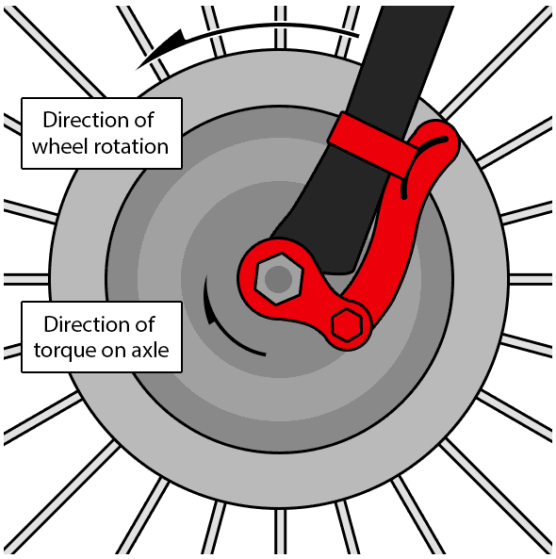
9. Insert the motor-wheel into the forks.
   Ensure the torque-washer fits into the drop-outs from the inside, like so:



10. Torque-arm

If you intend to de-restrict your ebike to power higher than 250W, you must protect the forks by adding a torque-arm. The purpose of a torque arm is to reduce the pressure on the fork drop-outs.

The TORQ-Arm is securely clamped to the frame using a hose clamp



The motor spindle must fit snugly all the way into the drop-outs, like so:

11. Fitting the Torque-arm

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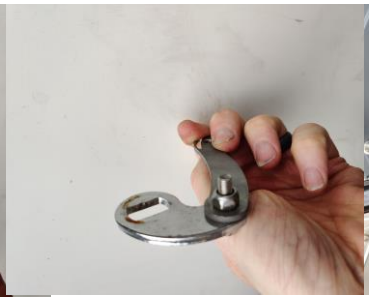

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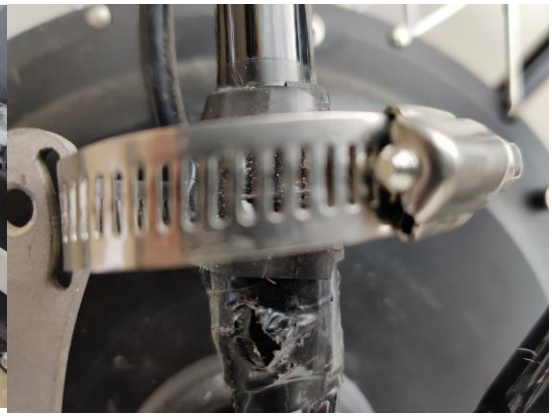

7

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10 *11* *12*

12. Put the chain around the freewheel and derailleur.

- While the bike is upside down, rotate the pedals by hand so the motor starts spinning.
- Shift gears and adjust the derailleur if needed.
  (Adjusting derailleur is best described visually. If you are unsure of how to do that, you are recommended to watch one of the many great video tutorials online).
- If the derailleur rubs against the motor and cannot reach the bigger cogs, repeat steps 4 to 12. This time iterate with Spacers before and after the freewheel to achieve better alignment.
- Test the brakes and make adjustments accordingly.

Congratulations! You've completed the most demanding part of this project.

Chapter 5 - Fitting the Bottle Battery

1. Remove the Battery Holder (First unlock it with the key)

2. Fit the Battery Holder on the down-tube of your frame



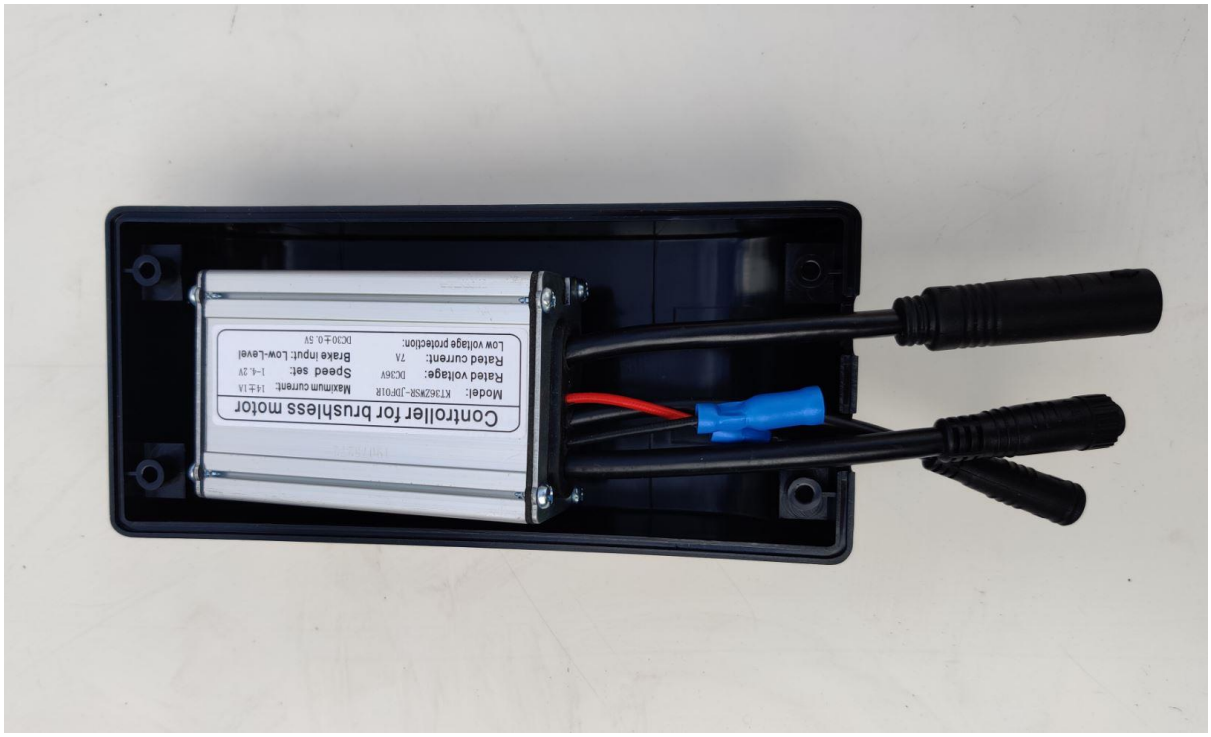
3. Slide the Battery into the Holder (and lock it with the key).


- Remember, the battery lock is only meant to prevent it from falling off during cycling and should not be regarded as a security lock against theft.

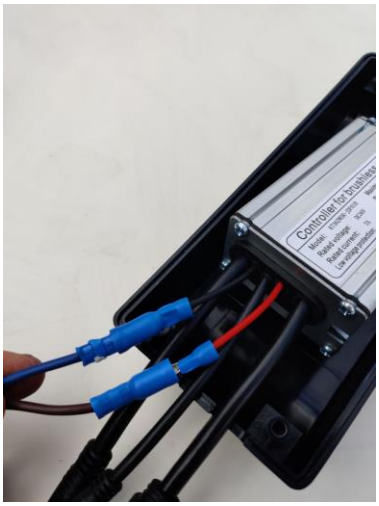
Chapter 6 - Plastic Controller Box

1. Screw the lid of the box to the underside of the down-tube:

2. Place the Controller inside the Plastic Box like so:



3. Connect the Battery bullet connectors:

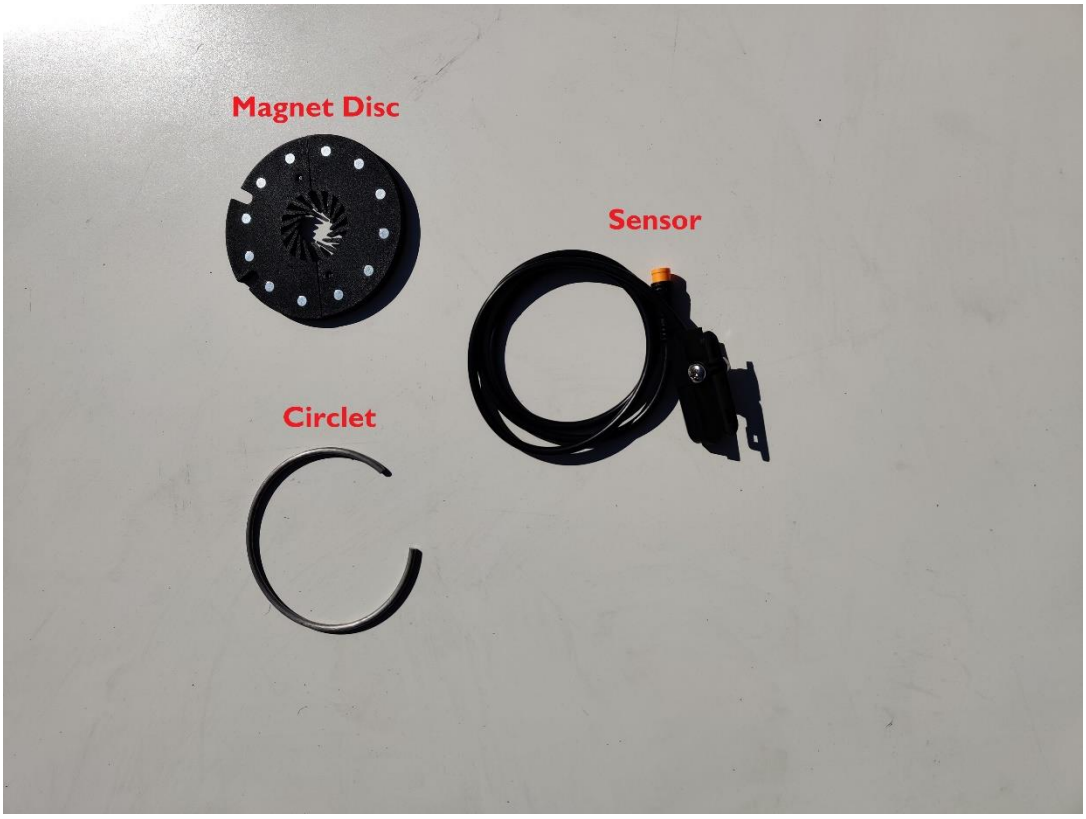


- Ensure the bullet connectors for the battery remain inside the housing to stay protected.

4. Screw the box unto its lid:

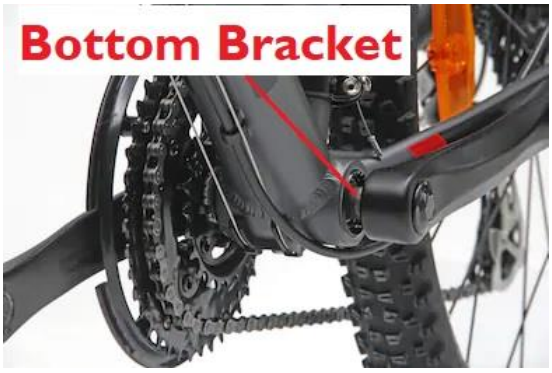
Chapter 7 - Fitting the PAS

1. We may already have fitted a special type of PAS on your bicycle bottom bracket for you. If so, just connect the yellow connector directly to the controller and skip the rest of this chapter.

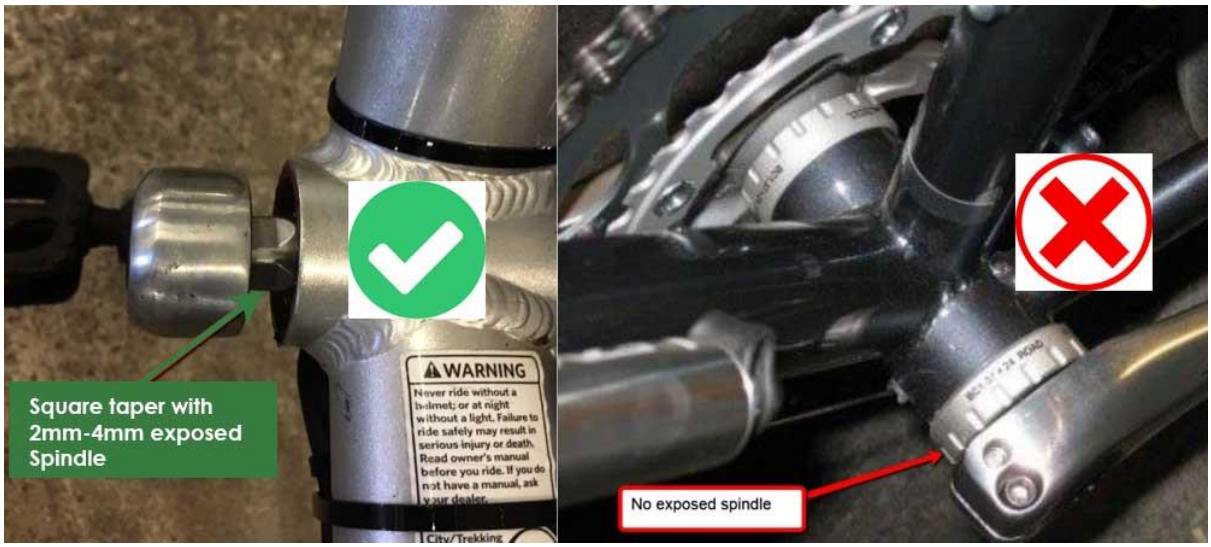


1. <u>Prerequisites</u>

   The PAS fits on the Bottom Bracket of your bike. A Bottom Bracket is the spindle that holds your pedal arms.



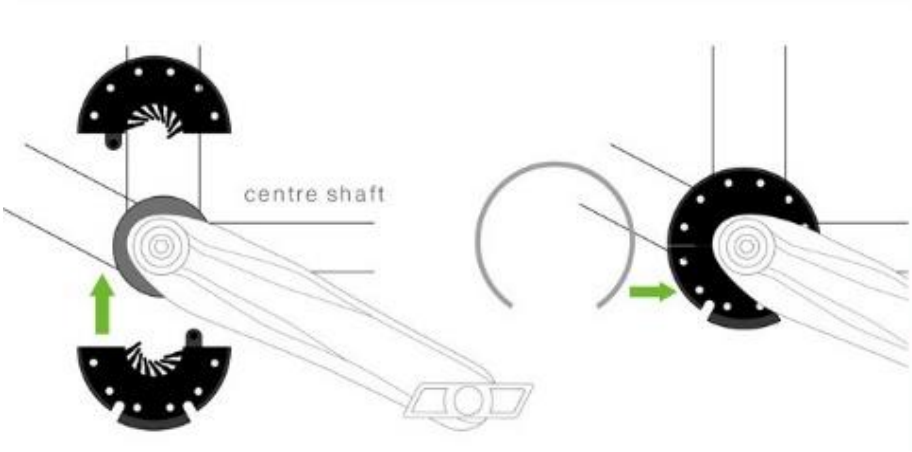
There are different types of Bottom Brackets. The most common is what's called a "Square Taper" type. The **PAS** is only compatible with **Square Taper Bottom Brackets**.



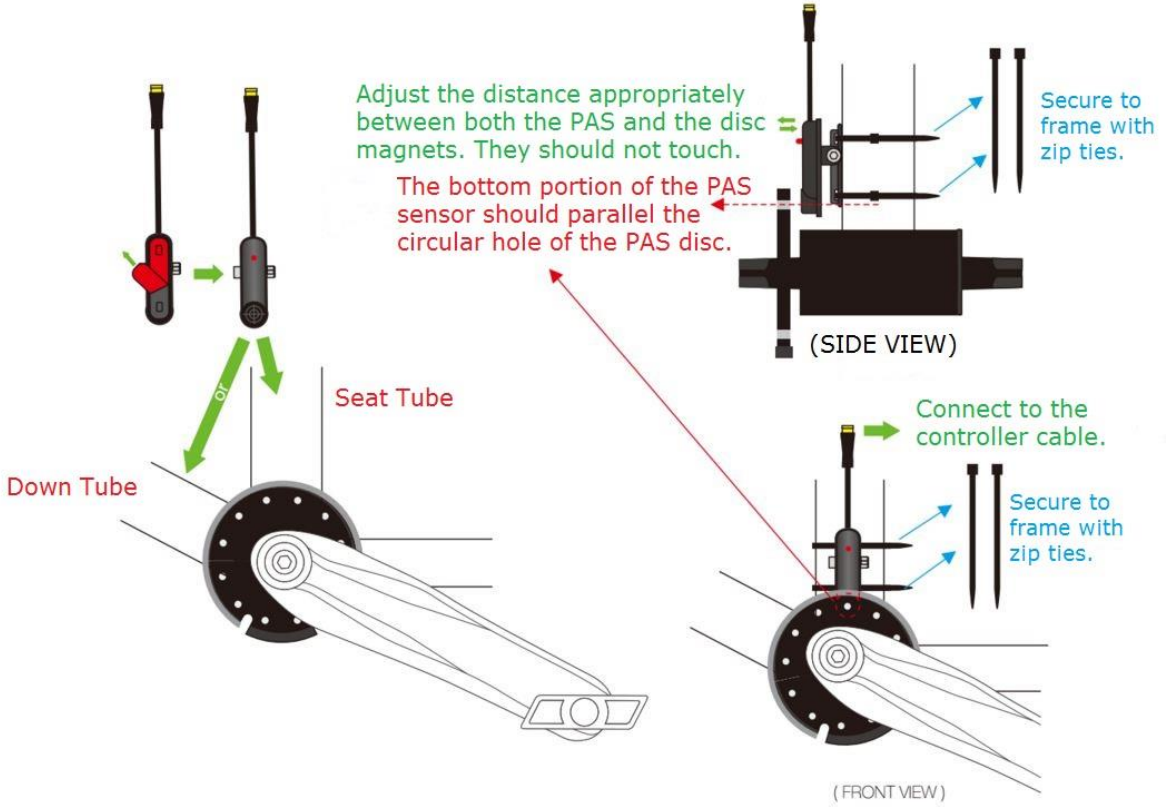
1. Dismantle the Magnet Disc.



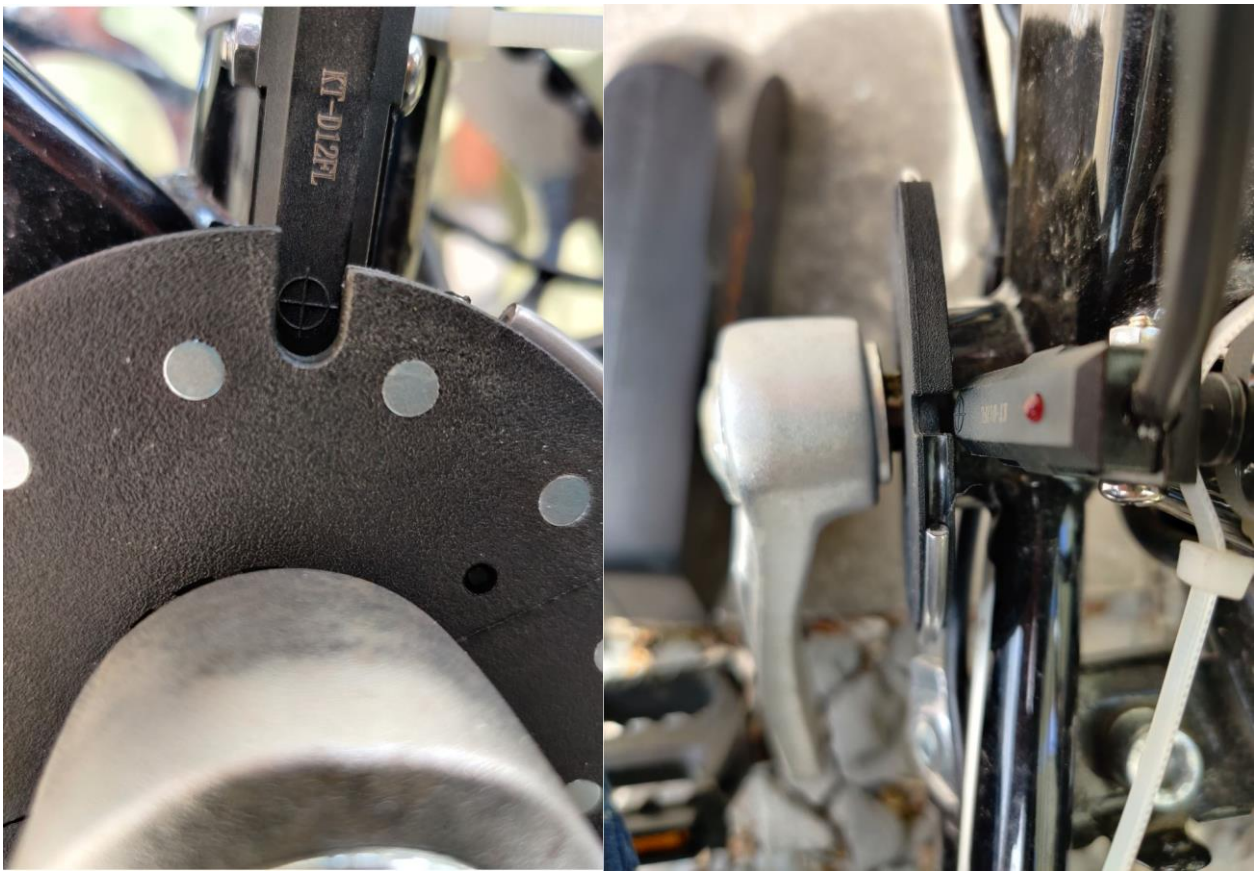

2. Fit the magnet disc around the Bottom Bracket spindle



3. Fit the sensor on either the down-tube or the seat-tube
   (pick the tube that allows the sensor to be positioned closer to the Magnet disc)



4. Ensure the bottom portion of the sensor (the plus sign) can be seen through the crevice of the Magnet disc



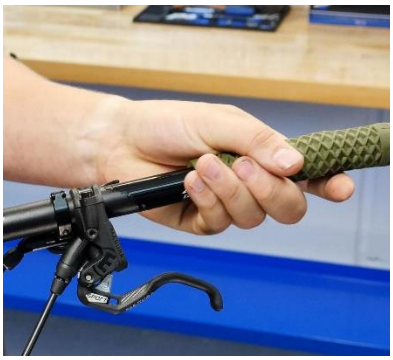
- Make sure the sensor is as close to the Magnet disc as possible, but not touching it.
- If you've fitted the PAS correctly, the red light will blink as you rotate the magnet disc passed it.
- The adhesive on the sensor is not enough to cope with real life conditions. Secure the sensor firmly with zip ties.

ATTENTION: If the spindle of your bottom bracket is too long, the Magent disc may move away from the sensor as you ride your bike. This will result in the power cutting out.
If you experience this problem, push the magnet disc closer to the sensor. And consider using hot-glue to keep the Magnet disc firmly in place.

Chapter 8 - Handlebar controls

1. Start by removing the grips from your handlebar:





Tip: Lift the grip with a screw driver and squirt slippery material underneath. This can be WD-40, bike-oil or even a homemade mix of water and washing up liquid.
Hairspray also works great as it acts as a lubricant when wet and as an adhesive when dry. Perfect for working with grips!

1. E-brakes

E-brakes are like regular brake levers but with the added function that they cut the electrical power when used.

These may already be installed on your bicycle handlebars.

2. **Mount the Throttle (optional extra)**

The Thumb Throttle is a lever that fits on the handlebar to power your eKit. It is the equivalent of a gas pedal on a car.

- Mount the throttle on the handlebar:
- Before tightening the Throttle screw, consider the positions of the brake levers and gear shifters. Determine the best order in which these three items are mounted on the handlebar for best reach and ease of use.
- Put the grip back on.

3. **Mount the Display**

The Display must be connected to the green connector of your system cable. Otherwise, power won't flow.

The display enables you to control how much or how little assistance you get from the PAS for a more intuitive ride. It also provides various useful functions like speedometer, odometer, battery load etc.

- The LCD is required if you need to de-restrict the Rear Drive Motors beyond their 250W setting (for off-road use).

More on how to configure the Display later.

Chapter 9 - Connect the cables

1. **System Cable**

- Connect the system cable to the items on the handlebar (in the same way you did in Chapter 1).
- Run the cable through the hole in the frame and connect it to the controller from the bottom.

- Use zip ties where necessary. But be careful not to pinch the derailleur and brake cables.

2. Motor-cable

- Your motor-cable might look slightly different depending on the motor you supplied.
- Connect it to the motor.
- Find the best route along your bike frame so you can connect it to the controller.
- Use zip ties as needed. Be careful not to pinch other cables.

3. Connect the Battery

- The bullet connectors of the battery are not water-resistant. So make sure these connectors remain inside the controller-housing supplied with your product.

4. Connect the PAS

Congratulations! You have now built your own fully functional e-bike!

Chapter 10 - Testing

- Switch the Battery on.
- Switch the Display on by pressing and holding the On/Off button.
- Lift the bike up in the air and press the Throttle. Your motor should spin. If not, disconnect the brake cables and try without them.
    - If there are still issues, there might be a loose connection somewhere. Disconnect and re-connect all cables.
- If your LCD Display is showing Error Code 3, disconnect the motor-cable from both the motor and controller and plug it back in again. Make sure the arrows are aligned and it is strongly pushed all the way into the connectors.
- To test the PAS, ask someone to help you rotate the pedals while the bike is in the air. The motor should spin. If not, check the position of the magnet disc in proximity to the sensor.
- If you are still having technical difficulties, follow the trouble shooting guide on Chapter 2.

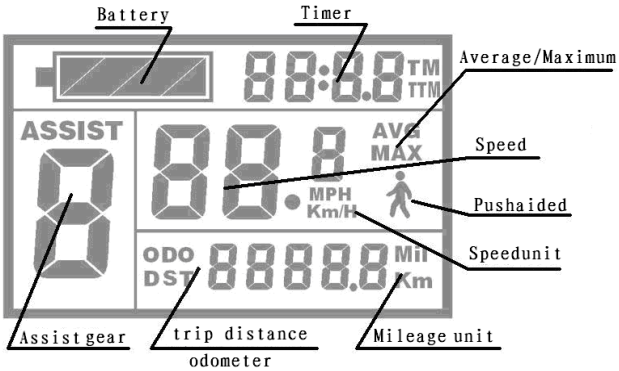
Chapter 11 - LCD Display Settings

1- The LCD has an on/off switch. This must be switched on for the bike to receive power.
2- If you leave it on without using the throttle, the bike will start giving you automatic assistance as you pedal along (provided you have installed the PAS).
3- You can use the UP/DOWN buttons to increase/decrease the amount of assistance you would like the bike to provide.
4- Switching the power off will transform your bike into a normal push bike.
5- The LCD also provides other functions such as speed, time, distance of your journey etc (see below).
6- Please note that the battery bars on the LCD may not necessarily show the amount of capacity left on the battery, but the amount of load the battery is experiencing at any one point. Decreasing battery levels on the dashboard means you ought to be pedaling more. We do not recommend you run on the throttle alone for long distances as this will impact the performance and lifecycle of the battery.
7- The battery performs best with a payload less than 80Kg. Heavier cyclists may notice the battery levels dropping on the Display as the throttle is being used. This is an indication that the battery is getting overloaded and, therefore, sharing the load with some pedalling is strongly recommended.
8- To see the actual capacity left on the battery, check the indicators on the battery itself.

LCD Instructions and Setup

- Display under common running conditions

Main view



- Battery indicator
- Trip time (TM)
- Level of assistance
- Current speed
- Trip distance (DST)
- 6Km/h assistance power mode (push aid)

Riding History Data View

- Odometer (ODO)
- Maximum speed (MAX)
- Total trip time (TTM)

- Average speed (AVG)

- Function of buttons

The LCD device comes with three buttons; the centre button is market with SW, whiles the UP/DOWN buttons are marked with arrows accordingly.

On/Off

- To switch the device on, press and hold the SW button.
- To switch it off, press and hold the SW button (or the device will automatically switch off when the bike is left without use for 5 minutes).

Change level of assistance

- Under normal operating conditions, use the UP/DOWN buttons to change the level of assistance. Level 1 being the lowest, and 5 being the highest.

Illuminate screen

- Under normal operating conditions, press and hold the UP button to have the screen illuminate for use in the dark.

Push aided mode

- It is possible to use the 6km/h assistance mode while walking your bike. To do so, press and hold the DOWN button, the push aided indicator will start flashing. The bike will run at no more than 6km/h as you walk the bike along.
- Release the DOWN button to suspend this function.

- Trip Data View

- To enter the history trip data view, press the SW button once while the device is on. The ODO and TTM will appear.
- Press the UP/DOWN buttons to access the maximum speed and average speed information.
- Press SW again to exit this view (or it will automatically exit this view after 5 minutes of riding).

- User Setup

You must configure the following functions on your device:

a. Maximum speed.
b. Wheel diameter (16”-28”).
c. Unit selection (Miles or Km, MPH or Km/h).

ATTENTION: Not configuring this will result in the LCD showing wrong Speed/Distance readings.

- If the device is on, press the SW button to switch it off.
- Press the SW button to switch it back on.
- As soon as the LCD turns on, press and hold both the UP and DOWN buttons at the same time for 3 seconds (till you see a number flashing on the screen). This will take you into the LCD setup view.
- Adjust the maximum speed. (Note: you cannot achieve speeds greater than 25km/h unless you obtain the CycloTricity de-restriction codes after signing the relevant disclaimer. Merely setting a high speed on this step will not unlock the full power of your Rear Drive Kit).
- Press the SW button to move on to the wheel diameter. Use the UP/DOWN button to set the correct diameter.
  NOTE: If the wheel diameter is not configured properly, the display will give you wrong outputs when it comes to power, speed, time distance etc.
- Having adjusted the wheel diameter, press the SW button to move on to the unit selection. Use the UP/DOWN buttons to change between Km/h and Mph. The distance units (miles or km) will be selected for you depending on which speed unit you pick.
- Press and hold the SW button to save the settings and switch off the Display.

Chapter 12 - Things to remember

Battery care:

1- Before you use the battery for the first time it is best to give it a full deep charge for 12 hours. Then use the bike until the battery is completely drained. Repeat this charge/discharge cycle 3 times. After this “conditioning” process, you can leave the battery charging as and when you require.

2- If you are going to leave your battery uncharged for more than eight weeks it is best left half charged. You should then re-charge it every four weeks for 1 hour to keep it in top condition.

Warning: By leaving the battery idle for longer than 8 weeks, you run the risk of loss in performance or other detrimental faults that won’t be covered under the warranty.

3- Check the indicators on the actual battery to see how much power you have left.
Please note that the indicators on the handlebar Display lights/bars do not necessarily show the amount of power you have left, but the amount of load the battery is experiencing at any one point. If the LED lights/LCD bars go down to “Empty”, then this is a strong indication that you ought to be pedaling more to take some of the load off the battery. This will improve the battery life cycle.

4- Do not expose the bicycle or battery pack to fire, heat sources, acid or alkaline substances. Keep it away from radiators.

5- For best results, always charge the battery at room temperature.

6- Always make sure the battery is turned off before detaching/connecting it.

7- If your battery is damaged or appears to be overheating for any reason immediately return it to your retailer for advice and a safety check.

IMPORTANT: Lithium-ion batteries must be safety-checked by a professional annually. Failure to do this can constitute a safety risk. Contact us or your local dealer for your battery service.

Charger

1- Red light on the charger means the battery is charging. When the red light turns green, the battery is fully charged. Please ignore the green light and carry on charging for 12 hours for the first 3 charges to condition your battery.
2- Always disconnect the charger from the mains before disconnecting the charger from the battery.
3- Do not leave the charger connected to the mains when not in use.

Water

Your eKit is rain and splash resistant and can be used in all weathers (within reason). However, it is not water-proof. In other words, the electrical components of the vehicle, such as motor, battery, and controller, must not be submerged in water. And must not be stored or used in wet conditions for longer than 30minutes.

WARNING**:** Do not attempt to open the casings of the battery or motor as it could be dangerous and all warranties will become void. If you experience problems, refer to the troubleshooting guide in this manual or ask your local dealer.

Maintenance

Now that you have built your ebike kit, it will need extra maintenance. Always check for loose parts and ensure everything is fitted securely.

Ensure your bike is serviced by a qualified mechanic more frequently.

Chapter 13 - Limited Warranty

Only use this product in accordance with this user manual. We offer a 1 year warranty on all items inside your eKit box. The warranty only covers technical faults which have not been in anyway caused by the user deliberately or accidentally.

Those parts and/or products which are determined by Cyclotricity to be defective and to qualify for warranty replacement will be provided at no charge, only after a valid warranty claim is processed by Cyclotricity.

Warranty claims must be made by the original purchaser by contacting the original Cyclotricity dealer within the warranty period. Shipping & Handling fees will apply to all orders placed for warranty parts and/or products and will be invoiced to the customer/warranty claimant prior to said parts and/or products are shipped from Cyclotricity.

Cyclotricity, at its sole discretion, has the option of replacing with a new part, or factory re-certified part. The Limited Warranty stated herein is in lieu of and expressly excludes all other warranties not expressly set forth herein, whether expressed or implied by law or otherwise, including, but not limited to, any warranties for merchantability and/or fitness for any particular purpose. Cyclotricity shall in no event be liable or responsible for incidental or consequential losses, damages or expenses in connection with their products. The liability of Cyclotricity hereunder is expressly limited to the replacement of goods complying with this warranty or at the sole discretion of Cyclotricity to the repayment of an amount equivalent to the purchase price of the part in question.

NOTE: Damage caused by water, dropping or any collision is NOT covered. Failure to maintain the battery as per the guidelines herein will void the battery warranty.

Exceptions to limited Warranty

"Spin Out" – Spinning out the axles inside of your dropouts – We are unable to be there when the kit is installed so it is up to you to understand the high torque involved at the dropouts and install them correctly.

If your dropouts are not correctly suited to fit the axle then you should not install the kit on those forks. Get new forks, file the forks to the axle fit "flush" or contact your dealership to return the kit. We will not refund or replace a motor that has been "spun out".

"Over Voltage" – Connecting a battery larger than the voltage of this eKit can damage the controller, wires and/or connectors. Damaging any kit component or motor by connecting the wrong battery type will void the warranty. The Cyclotricity eKit will work with a 36 volt Lithium-ion battery pack only (or 48V for our 1000W+ systems). We strongly recommend the use of a Cyclotricity battery for best compatibility and performance.

Water Damage -

The warranty does not include damage from power surges, use of improper charger, improper maintenance or other such misuse, or normal wear. The Cyclotricity eKit parts are water resistant and fine in the rain but should NEVER be submerged in liquid nor stored or used in wet conditions for longer than 30minutes.