

# CONVERSION KIT

User Manual

Mid Drive Electric Bike Kit

BBS Bafang Mid Drive

BBS01, BBS02, BBSHD



English

Please read through carefully before beginning your conversion

# THANK YOU

Thank you for purchasing the conversion kit! We know you'll love it, and with some care, it should last for a very long time. Please read through this manual carefully before operating the kit.

This manual uses the BBS HD for installation steps, however, most steps are the same across the board for the BBS 01, 02 and HD. If you encounter any installation difficulties please contact us.

# SAFETY

## **Mechanical Safety Check:**

Routinely check the condition of your bike. Make sure no fasteners have come loose. Perform a visual inspection of the whole bicycle before every ride. Make sure tyres are correctly inflated within the range given on the tire sidewall. Check your brakes for proper operation.

## **Your First Ride:**

Be sure to pick an area away from cars, other cyclists, obstacles or other hazards to become familiar with the controls, features, and performance of your new electric bike.

## **Installation Difficulty:**

It is possible, as all bikes are manufactured differently, that certain components of your bike may remove or install differently and/or contain different steps. However, we have used a bike that is quite universal to demonstrate all the processes involved in the installation of this conversion kit. If you encounter any trouble we urge you to contact us for further assistance.

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# ITEM CHECK LIST

Each conversion kit is tested for quality control before shipping to a customer. Before converting your bike, it's a good idea to lay each of the components out to visualize how they will come together on your bicycle.



**Motor/ Cranks**



**Battery**



**Charger**



**Thumb Throttle**



**Pedal Assist Sensor/ Magnet**



**Display**



**Electric brake lever**



**Wiring Loom**



**Nuts**

- Before you begin your conversion, it can be helpful to lay everything out first and make sure all the parts are there.
- Something missing? Double check the box, even under the flaps. Those small parts can be sneaky. If you still can't find it let us know and we'll assist you ASAP.

# INSTALLATION OVERVIEW



## 1. Remove Contents

Take your components out of the box. Remove the protective packaging. Keep track of all the parts that you remove from the box. Remove the battery and put it on charge.



## 2. Prepare Your bike

Before installing certain components of the kit, your bike may need some initial preparation such as removing some existing components. This manual will walk through general guidelines of this bike preparation that should apply to most bikes.



## 3. Installation

Once your bike has had any necessary preparation steps completed, this manual will step through the installation of each component within the conversion kit.



## 4. Tidy Up

After you have installed all of the components needed to control each part of the kit, it's now time to tidy up the wiring harness and make your conversion look nice and neat.



## 5. Ride!

Once the battery is fully charged, you've checked your tire pressures and fasteners you're now ready to go!

# INSTALLATION PROCESS

## Crank Removal

Before installing the BBS motor, your pre-existing cranks and bottom bracket must be removed.

It is possible, as all bikes are manufactured differently, that your cranks and bottom bracket may remove differently and contain different steps. However we have used a bike that is quite universal to demonstrate the crank removal process to aid you.

Firstly, flip your bike upside down so it rests on the seat and handle bars.

This will make working on your bike easier. If you have a bike stand you could also suspend your bike on the stand.

Next, your crank bolt must be removed. This can be done using allen keys or the crank removal tool provided in the tool kit, depending on what sort of cranks your bike has.

In our case we used the crank removal tool combined with the multi sized spanner as shown in the third photo on this page.



# Crank Removal Continued

Now the black portion of the crank removal tool should be threaded into the crank as shown in photo 1.

Next insert the silver part of the crank removal tool into the black part, as shown in photo 2, and using the multi-sized spanner, continue to thread the silver portion in until it forces the crank to pop off the spindle.

You should now have a clear spindle with no crank. As shown in photo 3.

This process can be followed to remove the crank from the other side of the bike as well.

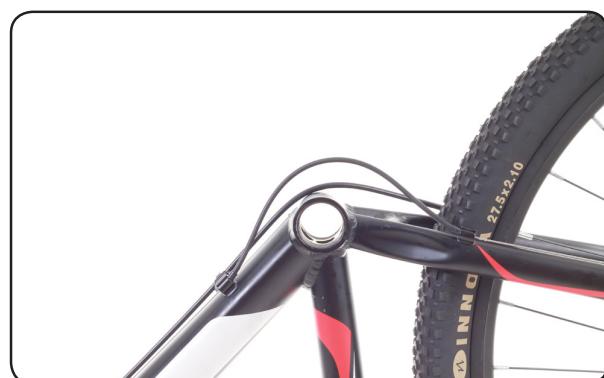


## Bottom Bracket Removal

The next step is to use the bottom bracket removal tool in conjunction with the ratchet to remove the bottom bracket cups.

Photo 2 shows how to insert this tool into the bottom bracket cup, then the bottom bracket cup must be loosened using the ratchet until it can be removed.

This should also be done to the bottom bracket cup on the other side of your bike, which should leave your bottom bracket on the frame empty as in photo 4 of this page, ready to insert the BBS motor.



# Front Derailleur Removal

The front derailleur and front gear cables now need to be removed. If your bike does not have a front derailleur/ front gears you can skip this step.

The front derailleur can normally be removed from the frame by simply loosening one Allen key bolt. The clamp on the derailleur should unhinge in order to take it off the frame.

Now we are confronted with a tricky part. You will find that the chain goes through the front derailleur.

If you don't care about the front derailleur, as it is not needed in the BBS motor conversion, you can simply cut the derailleur in order to remove the chain.

If you would like to keep the front derailleur as a spare part, then you must remove your chain.

This can be done easily if your chain has a quick link.

If not, you may have to break the chain using a chain breaker, as shown in photo 3.

If any of these steps seem to difficult for you, please contact us.

Remove the cables associated with the front derailleur that was just removed.

Reinstall the chain, with the front derailleur removed and we are now ready to move on to the motor installation.



# Motor Installation

Now that the bike is ready to have the motor installed, the motor and its parts should be disassembled as shown to the right in photo 1. The components you have for this motor installation are the main motor, two cranks, two crank bolts, Bafang locking nut, bottom bracket locking nut and the fixing plate that has two bolts.

The first step of the installation is to slide the shaft of the motor into the bottom bracket of the frame as shown in photo two.

Photo three shows how the motor should be pressed up against the down tube of your frame before tightening all the motor's fasteners. Make sure any cables that run along the down tube of your frame are clear from being clamped down by the motor as this could cause these brake/gear cables to fail.

The next step is to put the fixing plate onto the motor shaft and tighten down the two bolts through the spacer and into the motor body as shown in the last photo.



# Motor Installation Continued

The bottom bracket lock ring should now be threaded on to the motor axle.

This lock ring should be tightened to 50-60 Nm of torque using the bottom bracket lock ring tool as shown to the right in photo 2.

Now the Bafang lock ring can be threaded on to the motor axle.

This lock ring should be tightened to 25-30 Nm of torque using the 8FUN lock ring tool as shown in photo 4 of this page.

The motor installation is now complete.



# Crank Installation

BBS kits come with a new set of cranks, these simply slip onto the motor axle.

The crank bolts supplied with this kit should be inserted as they are shown in photo 1, and then tightened with an allen key as shown in photo 2.

Your pedals can now be reinstalled using the multi sized spanner included in the BBS tool kits. Most pedals will have a 15mm spanner size.

Lastly your chain should be put onto the motor sprocket as shown in the photos at the bottom of this page.

The rest of the installation operations can be carried out while the bike is standing upright on its wheels.



# Battery/ Battery Cradle Installation

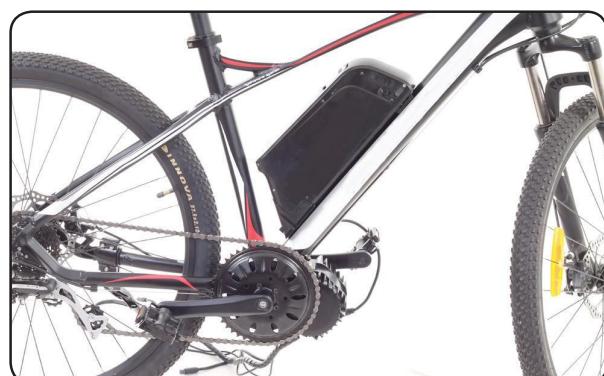
This kit comes complete with a custom built battery cradle that interfaces with the drink bottle holder holes in the downtube of your frame and allows you to securely lock the battery into place.

To start, make sure you have separated the battery from its cradle as shown in photo 1.

Next, make sure you have removed the two bolts where the drink bottle holder goes, shown in photo 2.

Finally, align the slots in the cradle with the holes in the frame. Insert the two bolts through the cradle into the frame as shown in photo 3. The cradle can now be slid up and down the down tube to find the most optimum position. Once this is done, tighten the two bolts and slot the battery in it's cradle. The completed battery and cradle installation can be seen in photo 4.

Turn the key in the battery to lock it in place.



# Brake lever and Thumb Throttle Installation

Start by loosening both brake levers and sliding them out of handle bars.

Next, slide the thumb throttle onto your handlebar, usually the right side, however it is up to personal preference which side the throttle goes. Slide the electric brake levers onto the handlebars.

Once the throttle and brake lever are in a comfortable position tighten your brake lever.



## PLEASE NOTE



For users in states or territories that require no hand throttle nor electric brake levers to be used, (pedal assist only), you can pass these steps and leave the throttle absent, and keep the original brake levers

# Display Installation

Mounting the display is easy. The display should be mounted to the clamp first, using two screws.

Next, remove the nuts and bolts from the clamp and put the clamp on the handlebars.

There are rubber spacers included in the kit that go inside the clamp depending on the thickness of your handlebars. Now put the nuts and bolts back into the clamp and tighten them securely.

Position the display so that it will be hassle free to glance at during your ride.

The angle of the display can depend on the rider style or the shape of the handle bars.

Attached to the Display is also a Pedal Assist Controller. This Controller also has the On/Off button on it.

The way this controller works is that it has a number rating that will appear on the screen. The higher the number, the more that the motor will assist with your riding or pedaling.

This pedal assist controller should be slid on to the handlebars on the side most preferred by the rider and then tightened in a comfortable position. This is shown in photo 2.

Tighten your brake lever in place, and do a final check of all the controls that they are all comfortable and tightened.

The grips can now be reinstalled to your handlebars.



# Pedal Assist Sensor Installation

Firstly, install the pedal assist sensor on your frame as shown in photo 1, using the sticky adhesive that is on the base of the sensor. The sensor should then be zip tied in place to make sure it is secure.

The magnet should be loosened apart and then placed onto a spoke and tightened so that the magnet will be opposite and parallel of the sensor as shown in photo 4.

The purpose of the pedal assist sensor is to generate a signal from the rotation of the wheel that the controller then processes to know that you're pedaling and want some power!

The level of assistance you receive is controlled by your handlebar display buttons, which we already fitted with the display, (up and down buttons).



# Wiring Installation

The wiring now has to be connected up so that everything has power and can function correctly.

All the wires are color coded so it is simply a matter of connecting the same colored wire ends together.

1. The first wire to connect is the main wire connecting from the controller to the battery. This wire has two pins at the end as shown in the first photo. At the end of the wires are arrows, align the arrows and then insert the pins.

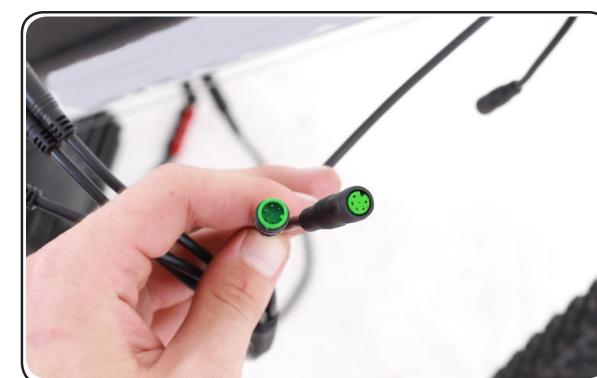
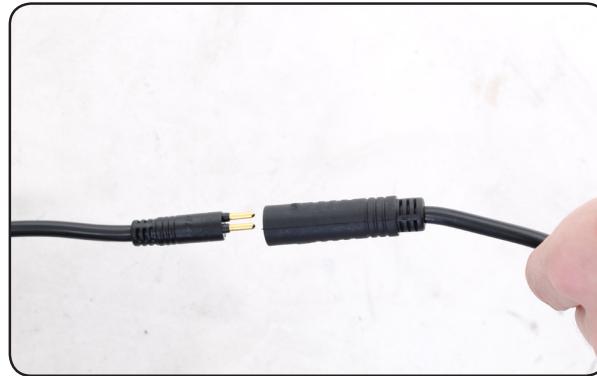
2. Then wire the pedal assist sensor to the motor. This wire as shown in photos 2 has a plastic cap that threads on after inserting the wires, to ensure a tight connection.

3. Now connect the Wiring Loom to the motor. These wires are colour coded with a black end plug shown in photos 3 on this page.

4. Connect the throttle.

5. The green plug from the wiring loom joins with the wire coming from the Display monitor.

6. Lastly, the two left over yellow plugs will connect to the electric brake levers.



## TIDY UP

In the final stage of the installation, it's time to tidy up the wires and make everything look nice and neat.

In the adjacent images, you can see the provided zip/cable ties being used to bundle and secure the cables coming from the base of the battery/motor, pedal assist sensor, wiring loom and anything else leading up to the handlebars.

Also included in most kits is a protection pipe which can be used to group multiple brake/gear cables together to make for a neater appearance.

The installation is now complete, and your bike is ready to ride!



# BATTERY OPERATION

As previously mentioned in this manual, the key is used to lock the battery into the battery cradle. Turn the key clockwise to lock and counter clockwise to unlock the battery from its cradle. When the battery is unlocked, it can be removed from the cradle for charging.

The battery charging plug is on one side of the battery and the On button and key hole are on the other side of the battery (shown in these images).

Take one of the keys off the key chain before you're finished and store it in a safe place. The keys are coded so if you loose both you will have to ship your battery back to us to have the barrel replaced (not ideal!).

The battery should never be ridden or turned On without being locked into the rack. It should also never be dropped or treated roughly.

If your battery is returned to us and has signs of being dropped, this will void the warranty.



## Turning Your Bike On/Off

Once your bike and conversion kit have been properly assembled and wired you will obviously want to turn it on and ride! Ensure the battery is sufficiently charged and locked in, then press the Power button (it will stay in and glow blue). Next, hold down the Power button on the control on your handlebar until the display turns on. Now you are free to ride!

To turn off hold down the Power button on the control on your handle bars until the display turns off, then press the Power button on the battery. It will release and the blue light will turn off.

### PLEASE NOTE



Even with the battery locked in and turned off, the bike should be locked using a high quality bike lock.

# CHARGING

Charging the battery:

1. Plug the charger into the wall socket/outlet, just like a laptop or mobile phone charger.
2. Check that one of the charger indicator lights glows green
3. Plug the charger, (battery end) into the battery carefully, making sure it is all the way in. Do not force it if there is an obstruction.
4. The charger indicator lights should glow red whilst charging.
5. Once the charger indicator lights change to green, the battery is fully charged.

There is no way to over-charge the battery. When it is full, the charger will stop charging the battery automatically.

Charging time can vary from 1 to 5 hours if fully empty.

The battery should be charged once every 3 months as a minimum to maintain healthy cells.

The best way to charge your battery is to plug it in after every use, and leave it on charge until the indicator light shows the battery is fully charged. It is not good practice to only half or partially charge the battery.



## PLEASE NOTE



Only charge the batteries with the specified charger. Using a different charger may damage your battery.

# MAINTENANCE AND CARE

A little extra maintenance is required over and above a normal bicycle.

Spoke tension should be maintained to avoid loose/ broken spokes. This can be done using a spoke tool as shown in the photo to the right. If this is beyond your capabilities, it is recommended that a bike mechanic handles this.

As well as caring for your spoke tension, it's important to do a check on all of your fasteners every few months. It never hurts to go over your bike with tools, tightening and checking everything that can be checked. This will ensure you have a safe and well-serviced bike.

Keep your bike clean! There's nothing worse than having to work on a dirty bike...

Also keep in mind the usual bike maintenance like tyre pressures, brake pads, etc...

The motor in this kit is a sealed unit and requires no maintenance during its design life. Lastly, (just to reiterate) it's important that you charge the battery at least once every 3 months to ensure the battery maintains a safe storage level.



# TROUBLE SHOOTING

Our troubleshooting advice will take you through a logical way to diagnose any issues that may arise during installation and use.

Before commencing troubleshooting, disconnect all components. Do not short cut this process. There are countless times a loose plug has caused grief. By disconnecting all the plugs and then reconnecting just the crucial components, this will solve any loose plug issue.

Go through one by one by plugging in the other components (such as the pedal assist sensor or the e-brake handles) to see if any of these are the cause of the problem. In this basic state you may discover the culprit quickly.

Fault	Solution
<b>Display turns on, but motor does not activate</b>	Check the motor plug from the controller. This is a very stiff connection and will not work unless the plug is all the way in to the indicator line. The twisting of the handlebars can sometimes cause the plug to pull out slightly if there is not enough slack in the motor cable.
<b>Motor runs backwards</b>	Remove the motor from the frame and switch the direction.
<b>Display won't turn on, unless the battery charger is plugged in</b>	Check the display connections, make sure the battery is charged. If the display turns on only when the battery charger is plugged in, you will have to contact our support team.
<b>A high pitched rattling noise can be heard when accelerating</b>	Check where does the noise come from, the motor or the loose parts. For example a loose spoke or even a bolt on your rear rack. If something is just a little bit loose, sometimes this can reverberate and make a harsh high pitch rattling sound. Nothing is broken or wrong, you just have to identify the loose part!
<b>Rim has a buckle or spokes coming loose all the time</b>	We would recommend a competent wheel builder to fix any major spoke tension issues, however there are some really good youtube tutorials on how to adjust spoke tension.
<b>Spokes have snapped or missing</b>	We stocks spare spokes for very reasonable prices, just check out our spares section online and you can find the right type and length for your kit.

# TROUBLE SHOOTING CONTINUED...

Fault	Solution
<b>Motor does not fit in the bottom bracket</b>	Any bike with an internal bottom bracket between 68 and 73mm wide will be compatible with this kit. If the bottom bracket has any small defects like a bur or foreign particle in the way, you may need to use a file to smooth these out. The mid drive kit requires a very good fit and this can make it quite stiff to install, but it will fit!
<b>Motor does not fit in the bottom bracket (cont.)</b>	Unfortunately there are always going to be rare cases when a manufacturer of a bike has decided to be different. If this is the case and there is not enough thread extending out the other side of your bottom bracket (requires 10mm+) or the motor simply won't slide into your bottom bracket if the diameter is too small, you may have to seek assistance from a bicycle mechanic or preferably. The motor spindle that slides into your frame bottom bracket has a diameter of approximately 33.3 mm so your bottom bracket should also have a diameter around this value.
<b>Wiring to a part of the kit is not long enough</b>	Please contact us for longer wiring.
<b>Drink bottle holder bolts won't tighten</b>	You may require some longer bolts. The bolts should thread into your frame a reasonable amount as they will be holding the battery to the frame and this connection should be as structurally sound as possible. If you feel as though the bolts aren't long enough, please get some longer bolts as using bolts that are too small may cause the thread to strip.
<b>Handlebar too crowded</b>	If for instance you have integrated shifters, you might find that with the throttle and shifter on the right side, you have run out of room. If you can't manage to shuffle everything around to make room, you may prefer to opt for a thumb throttle.
<b>I have hydraulic brakes, or integrated shifters and brakes</b>	If the e-brakes provided are not ideal, either you can elect not to use e-brake handles (the kit will still function) or you purchase from us e-brake cut-off sensors which can mount to your existing brake handles, no matter what kind.
<b>I don't want to use the pedal assist, or don't want to use throttle</b>	The controller is configured so you can run both the pedal assist sensor, and the throttle, or one or the other. If installed, the throttle will always act as an override.

# TROUBLE SHOOTING CONTINUED...

Fault	Solution
<b>Kit won't turn on at all</b>	Get a hold of a multimeter and test the voltage (DC) output from the base of the battery. If this isn't over 41V on a 36V kit, then the battery may have to be returned to us for testing and potential replacement. If this is not the issue, then please double check the connections. With reasonable voltage, the kit should turn on if there is no fault with the display.
<b>Error message on the display</b>	Please refer to display manual for error code definition and if needed, report the error code to us in a service ticket.
<b>My kit loses power over bumps</b>	Check all connections to make sure all the plugs are all the way connected. Check that the battery is locked to the cradle and not loose. A momentary discontinuity in power will turn the kit off.
<b>My battery cuts out intermittently</b>	If the battery is low on power, or you are going up a very steep hill with a load on the motor, you will likely experience a voltage cut-off if you have overloaded the controller, or dropped the voltage below the low voltage cut-off, which is more prevalent at low power. This isn't a fault with the kit, it's just physics.
<b>I would like my battery capacity tested</b>	Please contact us by submitting a support ticket to arrange the return of your battery for testing. If the battery tests above 85% capacity within the first year (from purchase date) you will be liable for return freight. If it is tested and is under capacity within the warranty period, your battery will be replaced.
<b>My range has degraded</b>	See next page.

# TROUBLE SHOOTING CONTINUED...

Range extension:

If you're not getting the approximate quoted range out of your e-bike system, take the following steps:

## 1. Pedal Assist Sensor

If you haven't installed the pedal assist sensor, you might not get the required range out of your kit. The pedal assist modes only work for pedal assist input, not throttle. If you use the throttle on low levels of pedal assist, this will not make any difference. Pedal assist levels are only for pedal assist. The throttle is great fun to use, but even moderate use of the throttle, with pedaling, is still going to burn through the juice a lot faster than on a low-medium pedal assist setting.

2. Battery Indicator Lights – Full Charge. The LED and LCD battery level displays are a basic indication of battery charge, but they are based on voltage which is variable and not a true indication of battery capacity. The only accurate indication of a full charge, is having charged the battery and the battery charger lights glowing green to indicate that the battery is fully charged.

## 3. LED/LCD Indicator Light – Running Low

Some customers find that the LED/LCD charge indicator can lead them astray in terms of how far the bike will go on low power. You don't risk damaging the system by riding all the way to the controller low voltage cutoff. Keep riding on pedal assist even after the last battery indicator bar starts blinking.

## 4. Hills/ Riding Style/ Other Factors

The ranges quoted are from real world testing, with some hills and some flat areas. If your commute involves a lot of hills, that's going to impact on the range of the kit. 1,000W kits are especially susceptible to being drained a lot more on hills (more than 250W kits anyway). If you need to purchase a second charger to charge the battery at half way, or if you need an additional battery, they will be available for purchase online.

## 5. General Tips

- Make sure the wheels are running free (rubbing brakes can halve your range quite easily)
- Keep the battery topped up between uses
- Make sure the tyre pressures are at optimum
- Pedal harder when taking off and select the right gear for assisting up hills

# CONTACT US

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