



CONVERSION KIT

User Manual
ARC STREET



English

THANK YOU

Thank you for purchasing your new ARC conversion kit! Please read through this manual carefully before operating the kit.



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 tyre 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 newly converted electric bike.



PLEASE NOTE

We highly recommend the purchase of the ARC hub motor conversion tool kit. It will make your installation and ongoing maintenance much easier. This can be purchased online.

ITEM CHECK LIST

Each conversion kit is strictly 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 visualise how they will come together on your bicycle.



Motor wheel



Battery, Cradle and Keys



Charger



Display and thumb controls



RPAS



Controller



Wiring with colour coded plugs



Handlebar controls



ARC Torque Arm

- Other parts included are the bonus rear rack, motor extension cable, nuts, washers and specialised fasteners, e-brake sensors and cable ties to help tidy up the installation when finished. You also have the option of a twist throttle or thumb throttle (you will have to decide which one suits your installation better).

Contents

Thank you	2
SAFETY	2
Item check list	3
Installation process	5
Wheel Install	6
Wheel Install continued	7
Battery Cradle Installation	9
Battery Cradle Installation continued	10
Throttles and grips	11
Display	11
E-brake sensors	12
Controller	13
Controller continued	14
Removable Pedal Assist Sensor (RPAS)	15
RPAS Continued...	16
Battery Operation	17
Charging	18
Maintenance and Care	19
Trouble Shooting	20
Trouble Shooting Continued...	21
Trouble Shooting Continued...	22
Trouble Shooting Continued...	23
Specifications	24

INSTALLATION PROCESS

Before you start your conversion, you will have to decide if you're installing the battery on the down tube (recommended) or on the provided rear rack (manual separate). You will also have to decide if you are going to install a throttle (you can run the system without) and which of the two throttle options is going to work best with your bike.

Most commonly the thumb throttle is preferred, as it leaves more room on your handlebars for other components. Using the thumb throttle means you can even use your current grips if you prefer, leaving your handlebars almost untouched.

One of the many benefits of the ARC kits is the flexibility in the installation.

Once you have decided on the ideal conversion for your bike, it's time to prepare the bike. Start by checking over each component and familiarize yourself with the terminology. A common mistake is when people refer to the LCD display as the 'controller'. The LCD functions as a readout for the conversion kit. The controller is actually the rectangular box which houses the major functions of the electric system.

Once you have looked over the parts to familiarize yourself, remove the grips from your current bikes (if installing a throttle) and turn the bike upside down so it rests on the seat and the ends of the handlebars (if you don't have a bike stand). Take the front wheel out and deflate and remove the tyre, tube and rim tape. Install these onto the new electric wheel.

If you're installing disk brakes, it's ideal to remove the caliper which will make it easier to install the front wheel.



Wheel Install

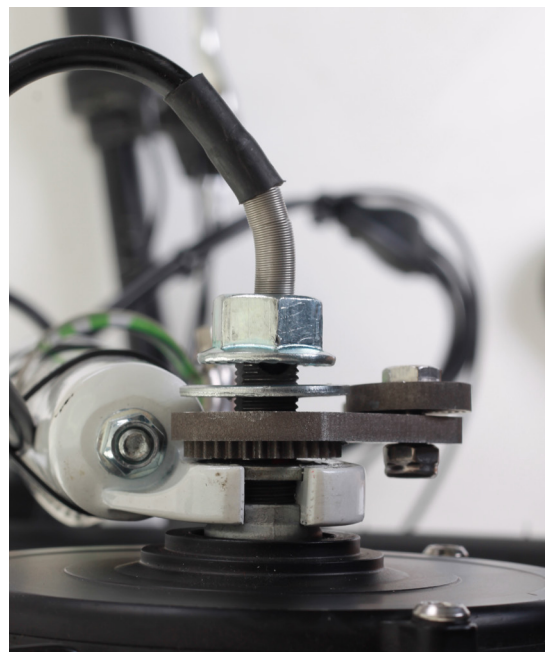
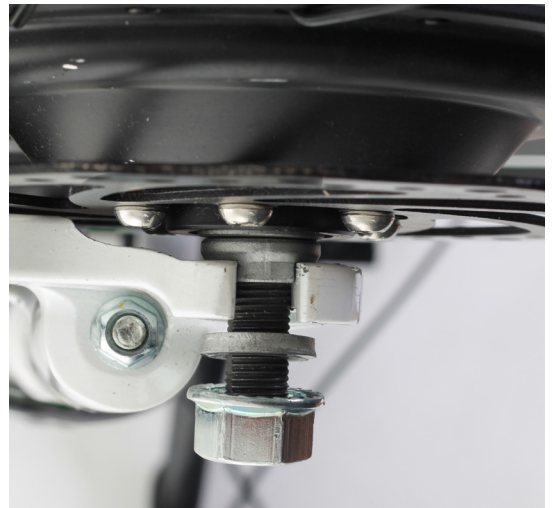
For those with front disk brakes, the disk brake rotor installs onto the side of the motor hub just like a regular hub. You can use the existing bolts that are already installed into the side of the hub. Simply loosen them, install your disk rotor and then tighten the bolts as shown.

Max 5Nm (40 lbs) tightening torque. If you overtightened these bolts, you may risk stripping the hub which is not covered by warranty. If you're not using disk brakes, you can leave the bolts and spacer as they are, or remove them completely. If you remove the plastic spacer and tighten up the bolts without a disk in place, the motor won't spin freely. Once you have installed the disk brake (if applicable), loosen the axle nuts on the electric wheel. This will allow the axle to slot into your dropouts. If you keep all the fittings in the same order, you shouldn't have a problem however for reference these photos show the arrangement.

In the bottom photo on this page we have added the torque arm. This is explained in more detail later on, however you can see the basic arrangement in this photo and the next. You can move the fasteners around on the motor cable side of the hub by sliding them all the off over the end of the cable (you will need to do this to install the torque arm pieces).

The distance between your dropouts should be around approx. 100mm. Your forks will stretch in and out a certain amount without causing any structural issues. The dropout axle slots should be approx. 10mm however you may need to file off a thin layer of paint for the axle to slot in all the way. The axles are designed to be a very tight fit, so don't stress if you need to remove a small amount of material, this is normal.

The cable that exists the hub should sit on the right side of your bike, (when sitting on your bike). Otherwise you're going to go backwards!



Wheel Install continued

With your bike upside down, your wheel should be pushed all the way down into the dropouts to make sure it's a nice and tight fit. This is very important. If the dropouts are not embedded firmly in the bottom of the drop out slots this could cause failure of the forks or cause the electric hub axle to become unsecure.

One torque washer should be fitted against the hub, on the inside of the forks (on each side) and then one flat washer on the outside. With these in place you can then tighten the axle nuts using a spanner or adjustable wrench. Make sure you have the right size as to protect the nuts from being stripped. Tighten to approx. 30-40Nm (250 - 350 in lbs).



ARC Universal Torque arm

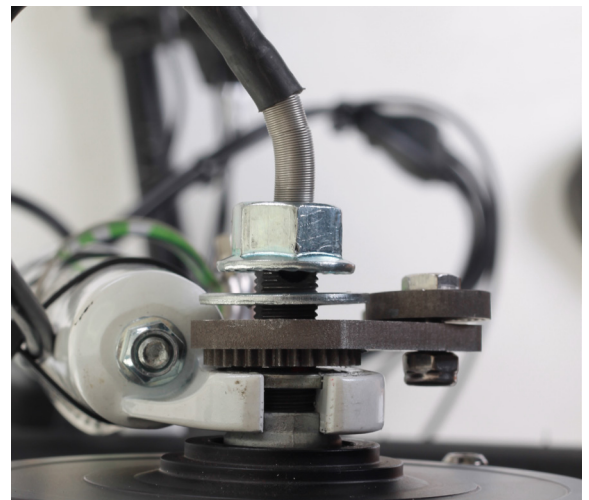
The first step in installing the torque arm is to assemble the splinned pieces over the motor axle. If you've already tightened the wheel nuts it's just a simple case of loosening off one of these and assembling as shown. We chose to install on the motor cable side. You can install it on either side. If you install the torque arm on the motor cable side, you can slide the components over the motor plug easily.

The next step is to bolt on the longest part of the torque arm to the outside splinned part with the bolt and nut supplied. This will usually be installed similar to the 3rd photo on this page, with the long piece on the outside of the splinned parts, to leave enough clearance between the motor hub and the torque arm components.

The next step is to position the torque levers and the splinned parts so that the two main levers are perpendicular to each other (at a right angle, 90 degrees) just like on the previous page.

Torque is force multiplied by perpendicular distance. To get the most out of the torque arm, the lever needs to be at max distance, which is when both arms are at an approximate right angle (90 degrees). This will efficiently transmit the torque away from your dropouts.

The hoseclamp supplied then anchors the arm to the fork which is the final step. For added safety, install a second torque arm on the opposite side (purchased separately and available online).



Battery Cradle Installation

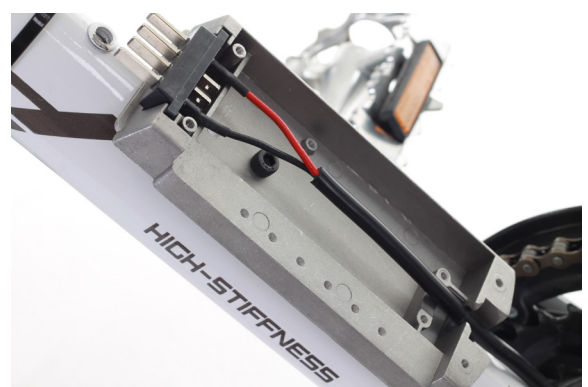
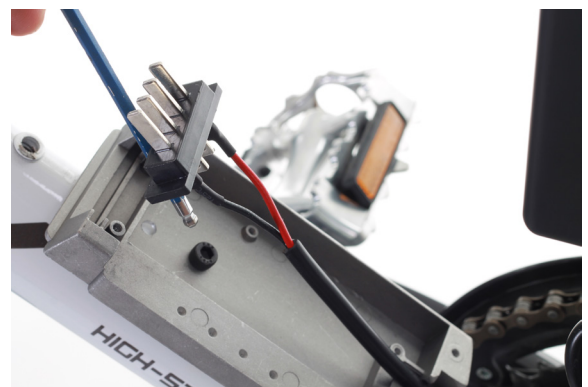
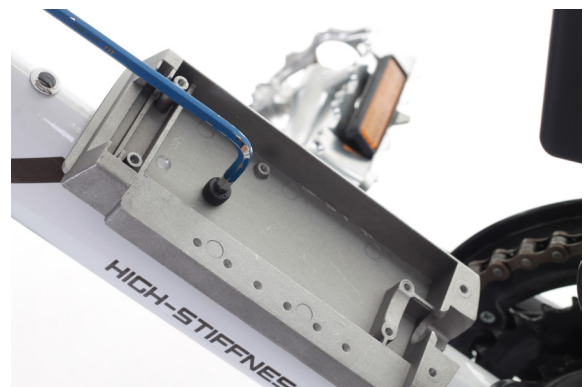
The battery installation starts with mounting the battery cradle. This is what your battery will attach to and lock onto.

The most common way to install the battery is by using the drink bottle cage mounts on your frame. Simply remove your drink bottle holder, (or the bolts in place) and you're ready to install the battery cradle.

You will be able to tell where your cradle will fit best by simply holding the cradle up against your frame. You can secure the cradle by using your existing bolts/screws and tighten as shown.

Be careful not to over tighten your bolts/screws as drink bottle mounts and threads are only 'nutserts'. If installed correctly the battery and cradle should feel very secure and not bounce over bumps.

You will need to take the cradle apart so that you have the metallic base separated from the polymer section. Firstly screw the base on as shown and position the battery terminals exactly as shown, with the positive red terminal on the right side if looking down at the terminals (from above).



Battery Cradle Installation continued

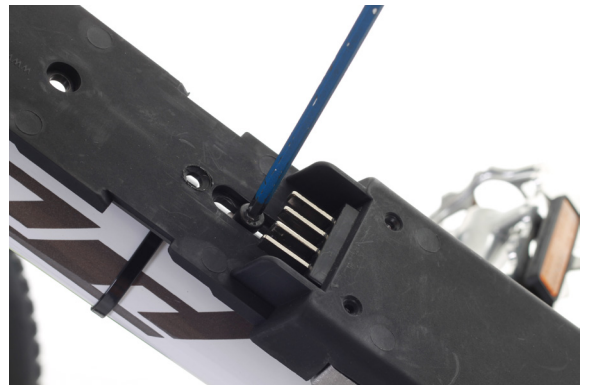
Re-install the polymer section of the battery cradle using the most convenient bolt bolts available. For a more secure fit, drill carefully into the frame at a perpendicular angle so you can mount additional fasteners that secure through the frame and tightened with a nut on the under side of the bicycle frame down tube.

Re-install the 4 screws that secure the lower part of the cradle cover. Now the battery cradle installation is complete.

If drink bottle mounts aren't an option, there are plenty of battery attachment options other than the method above, such as:

1. Install the battery on a rear rack (provided).
2. Drill through holes in your frame and use high tensile steel bolts and lock nuts to attach the cradle. If done correctly, this is a very solid option and you will only need to spend \$2 on fasteners.

The cradle should always be secure and rigid to avoid any vibrations or movement of the battery.



Throttles and grips

With the motor and battery mounted, it's time to move on to the easy part.

We recommend installing the thumb throttle. We recommend installing it on the right side. If this is suitable, it will mean you only have to remove the right side handlebar grip and you can re-install the same grip if you prefer your current grips.

Replacement grips are provided which allow for the thickness of the throttle if you prefer to install these. A full length grip is included for the left side of the handlebars to match the right side. This decision comes down to your preference.



Display

The display attaches to your handlebars using a dual clamp bracket.

This will arrive in two pieces and will be screwed together using the provided fasteners. Not all handlebars are the same diameter, so there's a couple different sized rubber bushes provided.

Once you have the bracket connected to the display screen, you can mount it to your handlebars using the provided bolts and captive nuts.

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

Be careful not to over tighten these fasteners as they are secured by plastic.

Once you have the display mounted you can fit the satellite keypad (thumb controls). This is a small module with three buttons to control the display. Up/Down and MODE (on/off). You can download the manual for this separately.



E-brake sensors

This kit comes standard with e-brake sensors which are a nifty little invention that enables you to use your existing brake levers. This solves a common issue from previous systems that required the replacement of the brake handles which is more time consuming and also problematic if you have hydraulic brakes or integrated shifters.

In this series of photos which show the installation, we have installed the magnetic square and the sensor on the top surface of the shifter. For a sleek conversion, these would normally be installed underneath so they are hidden.

The magnetic square and the sensor should be installed so that when the shifter is released, they contact each other. When you pull on the shifter when braking, the sensor will register the proximity change and activate the e-brake cut off.

Add cable ties to the sensor for added rigidity.

If you prefer not to add the e-brake sensors, the system will still function without them. For throttle only installations, e-brake cutt off is not necessary. For installations with pedal assist, it is highly recommended (and mandatory in some states).



Controller

The controller is the 'brain' and the 'muscle' of the kit. The controller has 4 connections:

1. Power from the battery. This cable is on the front side of the controller in the picture to the right. It has two large prong terminals for ground and positive. This plug cannot be installed incorrectly by design. There is also a set of arrows to show you the correct alignment.
2. Signals from the 4 to 1 cable. The '4 to 1' cable transmits the signal from the throttle, e-brake sensors and LCD controls from the handlebars to the controller. The plugs are all colour coded on the handlebars to avoid confusion. The 4 to 1 cable plug on the controller is shown on the front of the controller in this image.
3. Signal from the pedal assist sensor. This is separate because the controller is normally very close to the crank where the pedal assist sensor is located.
4. Power output and hall sensor input from the motor. The motor cable plug has 3 heavy duty phase wire terminals and 5 lighter gauge hall sensor inputs. The controller takes input from the hall sensor wires which tell the controller where the motor is in its rotation. The controller then switches the power from the battery many times each second to the motor via the 3 phase terminals. The controller in the ARC kits are signwave signal controllers which means the phases are softly ramped up and down, making the motor super silent and highly efficient!



Controller continued

The installation of the controller on the frame is straight forward. You would ideally install the controller on the seat tube. If your seat tube is a standard diameter, you can use the steel saddles to fasten to the frame. If these don't fit there are slots in the controller housing to allow you to fasten using cable ties.

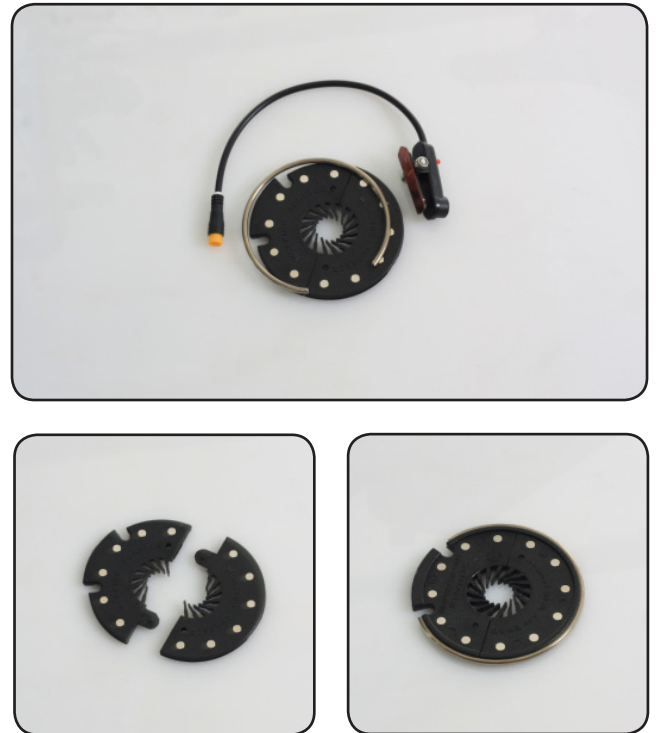
Once the controller is installed, you can begin connect the wiring.



Removable Pedal Assist Sensor (RPAS)

Normally this step would involve the removal of the crank which can be quite complicated. Thanks to the innovative RPAS, this step is now a breeze!

To begin, have a look at the black plastic magnet wheel and the way the two halves join together. When you snap them together on the crank axle, (on your bike) you will then need to fit the steel circlip around the outside groove.



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

How does this work? Magnets on the disk generate a changing magnetic field or a 'hall effect' and this is picked up by the hall effect sensor which transmits a signal to the controller. The pedal assist is the primary function of an electric bike and the level of assistance is adjustable on the handlebar LCD.

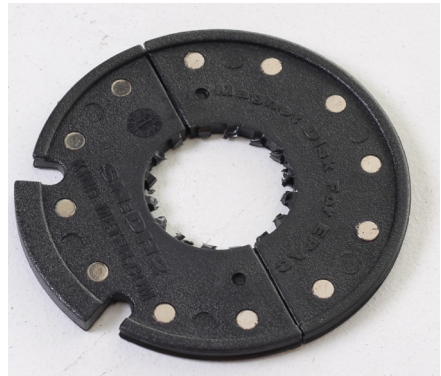
1. The sensor will need to line up very closely (under 5mm) to the RPAS disk.
2. Be sure to have the "working side" text facing the sensor. The RPAS is directional, so when you pedal backwards, the motor won't engage (that would be dangerous and annoying!)
3. With the two halves of the disk mated together you can mount the silver circlip onto the disk, without jamming your fingers in the process (ideal, but not always possible).
4. When fitting the hall effect cadence sensor, the adhesive section is only there to hold it in place while you secure the sensor with cable ties provided.

RPAS Continued...

Depending on the style of crank axle you have, you may need to modify the black plastic wheel and remove some of the internal 'vanes' of plastic.

You may be required to carefully remove a portion of the vanes if required. This would be done with a sharp pair of scissors or side-cutters.

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



Battery Operation

The battery used in this conversion kit is very sleek in design and also very functional.

The way it attaches to its cradle, is by sliding the battery down onto the cradle and locking it into place. Once in place it makes for a very secure fitting that won't rattle around during use (a common problem with other systems).

With the battery mounted to the cradle, you can now use the key to lock the battery in place. The key is only used for the locking function, it doesn't turn the battery on or off, in fact when riding it's best you remove the key and store it safely to avoid hitting it with you knee (or worse, losing it). 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 lose both you will have to ship your battery back to ARC to have the barrel replaced.

The battery should never be ridden without being locked into the cradle. 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.



Charging

Charging the battery:

1. Plug the charger into the wall socket/outlet, just like a laptop or mobile phone charger.
2. Check that the charger indicator lights glow 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 light 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 month 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.

Best practice battery use is to charge the battery to 100% fully charged after each use. Fully charge the battery before use if it hasn't been used in more than 1 week.



PLEASE NOTE

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

Maintenance and Care

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

One of the main things you may come across is that your spokes need to be tightened more often than a non-electric wheel. Our wheels use 12G and 13G steel and stainless steel spokes which handle the load and torque of these motors very well, but are higher maintenance.

This tool can be purchased online. Check the tightness of each spoke ideally after the first 100km and then every 500km.

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 month to ensure the battery maintains a safe storage level.



PLEASE NOTE

Any modifications to your conversion kit that aren't part of this manual will void your warranty.

Trouble Shooting

ARC's 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 plugging in the other components (such as the PAS 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
Display turns on, but motor does not Activate	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.
Motor runs backwards	Remove the motor from the forks and switch the direction.
Motor feels like it has something caught inside or some kind of brake on inside	Remove the disk brake bolts completely and see if this remedies the issue. If the disk brake bolts are too long, they will go too far into the housing and fowl against the internals.
A high pitched rattling noise can be heard when accelerating	The vibration of the motor is very small, but at this frequency it can do some odd things to the other components on the bike if they are loose. 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!
Rim has a buckle or spokes coming loose all the time	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.
Spokes has snapped or missing	ARC 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
Motor does not fit in fork dropout axle slots	If you are not comfortable in removing a small amount of material from your dropout axle slots, then the only alternative may be to buy some new forks. This is not covered under warranty because ARC is not the manufacturer of your forks. Fortunately headtubes are made to a consistent standard and alternative forks are both readily available and reasonably priced!
Motor does not fit within the 100mm dropout width	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 reasonable 'flex' in the forks to spread them wide enough to accept the motor wheel, you're going to have to buy new forks.
Disk brake bolts foul against the inside of the fork	If you're not running disk brakes, you don't need the bolts so just remove them. If you are running disk brakes, you will have to use some additional washers to 'space' the motor over to the non-disk brake side to achieve clearance.
Wiring to a part of the kit is not long enough	For this problem we stock a wiring extension kit which can be purchased online. This is usually recommended for rear rack versions of this kit.
Disk brake bolts won't tighten	You may require some longer bolts, but be careful they are not too long and foul against the internals of the motor.
Handlebar too crowded	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, which is available for purchase from ARC online.
I have hydraulic brakes, or integrated shifters and brakes	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 ARC e-brake cut-off sensors which can mount to your existing brake handles, no matter what kind.
I don't want to use PAS, or don't want to use throttle	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.
Display won't turn on, unless the battery charger is plugged in	Check all the connections, make sure the battery is charged. If the display turns on only when the battery charger is plugged in, you will have to submit a service ticket with this information.

Trouble Shooting Continued...

Fault	Solution
Kit won't turn on at all	Get a hold of a multimeter (\$15 on ebay) 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 ARC 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.
Error message on the display	Please refer to display manual for error code definition and if needed, report the error code to ARC in a service ticket.
My kit loses power over bumps	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.
My battery cuts out intermittently	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.
I would like my battery capacity tested	Please contact ARC 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.
My range has degraded	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

a. 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 250's 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

If you would like to submit a ARC service ticket, please go to this URL:

<https://ARC.zendesk.com/hc/en-us/requests/new>

SPECIFICATIONS

General

Model (year)	ARC Street
Designation	250W/350W Upgraded conversion kit
Main Use	On road, commuting, recreation and leisure
Nominal Power	250W/350W
Cruise Speed	25km/h / 32km/h
Max Speed	32km/h (restricted to 25km/h in display settings for AU/UK/EU)
Max Rider Weight	120kg

Battery

Battery Chemistry	LiMn2O4 Lithium Ion
Nominal Battery Voltage	36V

Weight

Total Weight - No Battery	4.5kg
Battery Weight	3.2kg
Total Weight	7.7kg

Components

Throttle	Twist Grip/Thumb Throttle
Peddle Assist	RPAS
Cut Off Switches	E-Brake sensors
Battery Protection	On Board BMS
Other Features	Lockable battery cradle included
Charger Type	SANS 36V 2A Smart charger with balancing
Battery Cell Type	18650
Cell Spec	Samsung 18650 2900mAh 29E
Cell Configuration	10S 5P

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