

Sick Bike Parts.com

Congratulations – you have decided to take the next big step in Motorized Biking....



Disclaimer: Bicycle riding can be dangerous. Sick Bike Parts in no way approves of dangerous bike riding. Our kits and parts are strictly for the hobby enthusiast with a detailed mechanical knowledge of bicycles. People attempting this addition should have experience building motored bike kits and bicycles. The modifications shown are not for racing, speeding or nonlegal on or off highway use.

Your kit was packed with care, however to familiarize yourself with all the parts, be sure you have read through and matched all parts on the parts list. Parts List Attached.

Fit up is required and some minor filing on the rough surface of your engine case is required. Only minor cutting or drilling is required, however all bikes are different and care must be used to set up YOUR bike as shown in this manual. We are always here to help, so feel free to contact us.

Before we begin let's first visualize all the steps in the installation process.

PLEASE follow the detailed steps within this document, but for ease of assembly the rough steps will be outlined prior to starting:

1. Remove engine and set on a steady, solid work surface.
2. Remove pedals, crank arms, and crank shaft from bike.
3. Install replacement crankshaft.
4. Install new chain rings and front freewheel.
5. Clean engine casting and install right side bearing plate and mounting plate on engine.
6. Reinstall engine on bike.

7. Assemble jackshaft and install.
8. Hook up shortened engine chain on engine side and install left side bearing plate
9. Install bike chain on the right side.
10. Cut out and install clutch cover and chain guard.
11. Make sure all connections are logical, all fasteners are tight and chains are properly tensioned.

Your bearing plates and motor mount come powder coated and do not require paint. Feel free to paint them if you choose. Remember to use standard painting practices, scuff and degrease the surface to be painted and use fuel resistant paint.

Here is a general list of tools and materials that you will need to complete this build:

Chain breaker
Files (small and medium)
Screwdrivers
Knife or tin snips
Allen wrenches
Sockets and or box end/open end wrenches
Thread locking material (such as Loctite)
Contact cement
Drill and
Emery paper
Other hand tools as needed

Failure to follow these instructions explicitly may result in loss of warranty.

Step 1

1. Remove engine and place on a solid, safe work bench.

Step 2

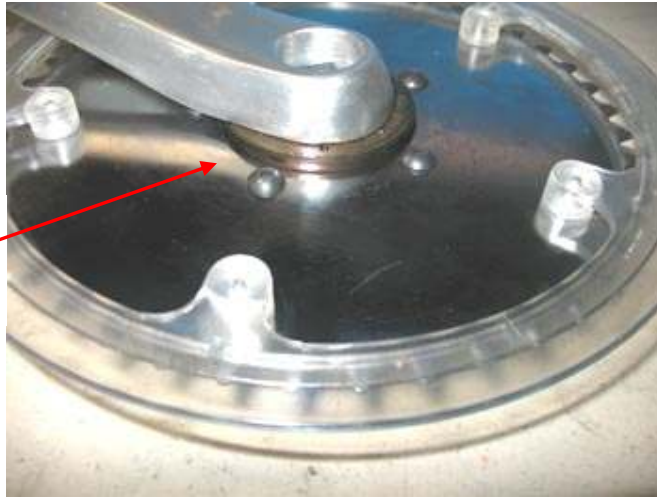
1. Remove crank arms. This typically requires a crank removal tool. If you do not have one your local bike shop can do this for you.
2. Undo retaining fasteners and carefully remove existing crankshaft, preserving all bearings and hardware. Remove all old grease, clean and re-grease bearings and races on new crank shaft.

Step 3

1. Reinstall new crank shaft in reverse order as above. Do not over tighten the gland nuts. The shaft should spin quite freely but should not have side movement.
2. Install the new left side crank. Do not over tighten the nuts.
3. Install your freewheel to the crank by screwing it on in a clockwise direction.
Note: If your standard freewheel came with a black washer install it between the crank and the freewheel. Notice that one side of the washer has a groove in it. This should go up against the freewheel.
4. Install your clear chain guard to the larger of the 2 chainrings. The chain guard should go against the flatter of the two sides. The tooth bevel should be on the opposite side of the chain guard.

5. Slide the large chainring over the crank arm and on to the freewheel.
6. Secure it with the 5 bolts so that the end of the bolts will be protruding past the freewheel toward the inside of the bike.

Note the chainring is on top of the freewheel flange



7. Next place the 5 spacers (6mm nuts) over the bolts up to the freewheel.



8. Then slide the smaller sprocket onto the bolts with the bevel side of the teeth facing the other chainring. The goal here is to separate the chains as much as possible.
9. Secure the small chainring with the 5 washers and locknuts.



10. Tighten the chainring assembly with the 5 locknuts and washers. Be sure that the bolts are tight against the outer chainring before installing the locknuts.

11. Install the jump stop chain guard onto your seat tube. No need to tighten or adjust this, it will be done later.
12. Install the crank, freewheel and chainring assembly to the crank spindle. Do not over tighten the nuts. **Be sure to put your bike chain around your bottom bracket before you install the right crank and freewheel assembly. Do not put the chain onto the chainring yet.**
13. The crankshaft and chainring should be complete
14. Freewheel maintenance, visit our download page.

Step 4

Prep engine for right bearing bracket mounting

1. Remove rear stock mount and studs. (The studs can be easily removed with double nuts or locking jaw pliers)
2. Remove the back three clutch cover screws
3. Assure that engine has no casting flash or burrs that will interfere with flush mounting of the brackets. Use files and other tools as necessary to flatten any raised areas and remove protrusions.



Flatten the back side of the clutch cover mounts as shown above.



Remove any casting bump that will keep the bearing plate from mounting flush to the back of the clutch case.

Step 5

You now have a decision to make. There are 2 methods that can be used to install the right bracket. Method 1 is easier and requires less work, but makes it difficult to remove your clutch cover if you need to adjust your clutch. Method 2 requires filing your clutch cover to remove the pockets that the old bolt heads were located but makes removing the clutch easier if you need to adjust your clutch. Both methods are presented so you can choose which is best for you. **Some engine manufactures have created a thicker clutch cover that will not allow you to use Method 2. Extra long bolts have been included for these engine kits to install using method 1.**

Method 1, easier but will not allow easy access to adjust your clutch

Install Right Bracket:

1. Use 3 supplied 6mm bolts to install in place of the existing bolts that were just removed.



2. Test fit the right side plate.

Due to the variations in the castings and hole locations of the different engines some modification to the hole spacing may be necessary. Once the plate fits over all three bolts check for any space between the plate and where the bolts exit the clutch housing. Add shim washers so that there is no gap and the plate rests flat against the back of the clutch housing.

3. Add the correct number of 6mm washers to the protruding bolts to get the bearing plate to sit flat against the back of the clutch case. Note there are thick ones and thin ones, use whatever combination works best so that the plate sits flat against the clutch case.
4. Install right bearing plate using the 2 lock nuts for the upper two bolts and the regular nut for the lower bolt.

Method 2, more work but will allow easier clutch adjustment.

Install Right Bracket

1. Remove the clutch cover and file or grind the pockets that surrounded the heads of the

three rear bolts. See the darkened area in the photo



The clutch cover in these 3 areas should now look just like the back. Test fit the 3 nuts to clutch cover to ensure they will fit and be able to be tightened without interference with the cover.

2. Test fit the right side plate.



Due to the variations in the castings and hole locations of the different engines some modification to the hole spacing may be necessary. Once the plate lines up with all three bolts check for any space between the plate and where the bolts exit the clutch housing. Add shim washers so that there is no gap and the plate rests flat against the back of the clutch housing.

3. Add the correct number of 6mm washers to get the bearing plate to sit flat against the back of the clutch case. Note there are thick ones and thin ones, use whatever combination works best so that the plate sits flat against the clutch case.
4. Mount the right bracket using the three 6mm bolts from the back side of the clutch housing so that the ends of the bolt stick out toward the clutch cover.
5. Reinstall clutch cover using the 2 front bolts and the three supplied nuts. Note there are 2 lock nuts and 1 regular nut. If you want to use 3 lock nuts you can use one of the ones from your old rear mount.



Step 6

Jackshaft Assembly

Arrange 5/8" shaft, gears, keys, lock collar and bearings for assembly on shaft. Sand and file the shaft, sprockets and keys so that they can easily be assembled and disassembled by hand. As we fit these pieces together they will need to be easily slid along the shaft for adjustment and disassembly.



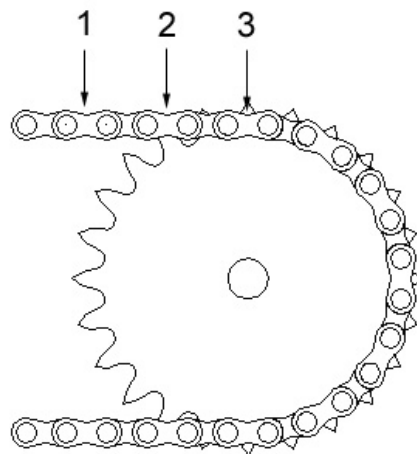
1. Place one bearing approx 1/8 inch (3mm) from end of jackshaft with the wider part of the bearing toward the end.
2. Slide the large washer over the shaft to the bearing.
3. Install the larger sprocket and key with the hub side against the washer.
4. Softly tighten the set screw that is not over the key, ensuring to maintain the 1/8 in of shaft sticking beyond the bearing
5. Slide lock collar on to the shaft and then the second bearing with the wider part of bearing toward the end of the shaft.



Step 7

Adjust engine chain

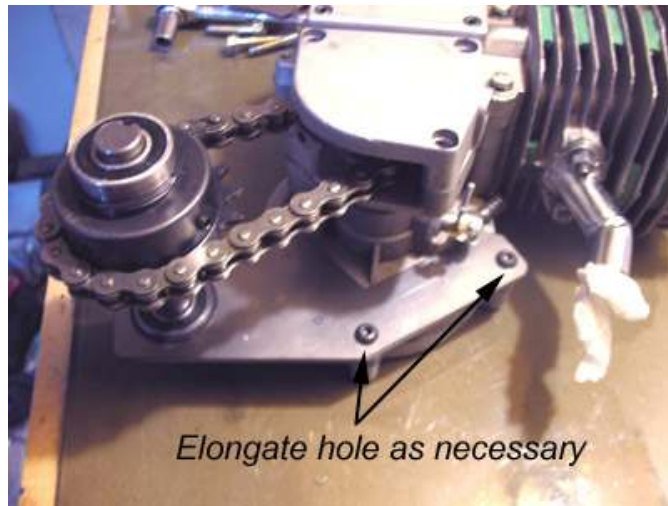
You will need to shorten the chain that came with your engine kit to 15 outer links. This counting method is shown in the diagram and will include the master link if you use one. A master link is not required but it does help with disassembly. (A chain breaker may be necessary)



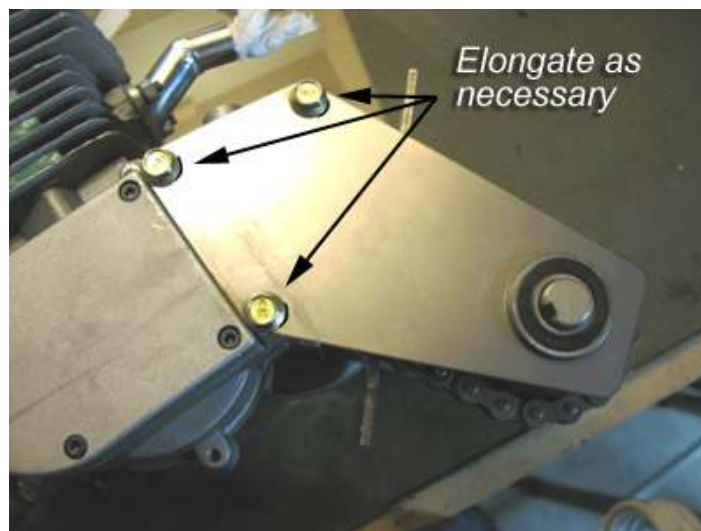
Step 8

Jackshaft alignment

Place your engine on a flat surface, clutch cover side down and place your partially assembled jackshaft into the right bearing plate. Install the chain but no need to use the retaining clip. You will also want to lightly tighten one of the set screws on the sprocket to keep it from sliding on the jackshaft.

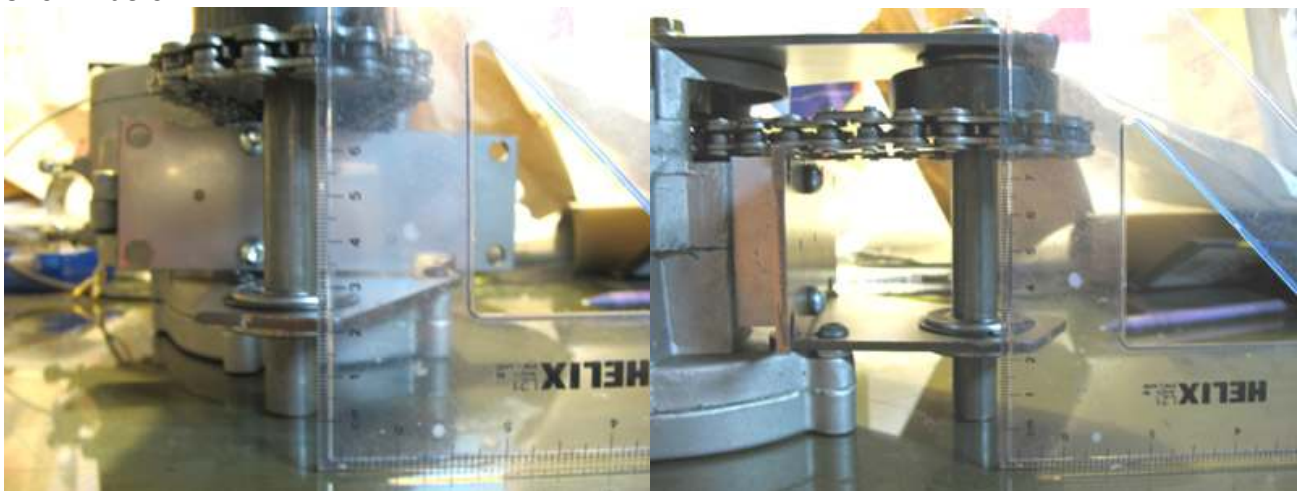


Test fit the left bearing plate over the engine sprocket cover and bearing.



Note: Stiffener is not shown in the photo for clarity.

Use a square to measure if the shaft is perpendicular to the surface that the engine is on as shown below.



Notice that we measured in 2 different directions? This is to ensure that the shaft runs square to the engine and the cranks.

If you find that it is not square, determine which of the mounting holes will need to be

elongated in the bearing plates to square up the shaft. Only elongate the holes, do not drill them larger. This can be done using a rotary tool or a small round file. We recommend that you adjust both plates in small increments. Only adjusting one to get the shaft square can cause you to remove more material than is necessary.

Also pay attention to the chain tension. Moving either of the plates will alter the chain tension. The goal is to have the shaft square and just the correct amount of chain tension. **Do not elongate the bearing holes.**

Remove the left bearing plate and jackshaft assembly. Tighten up right bearing plate bolts and nuts if required.

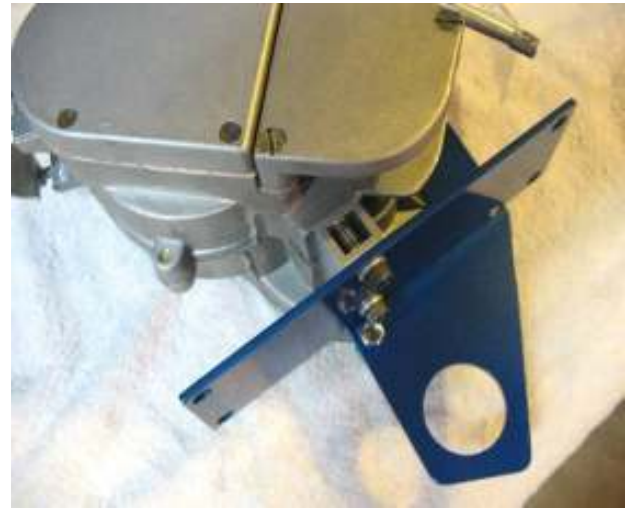
Step 9

Install rear motor mount



1. Place rear mount plate on top of square motor mount spacer.
2. Insert two socket head cap screws and lock washers and align with engine block.
3. Assure that notch on plate is on right side of the engine.
4. Thread screws into engine and tighten.

This can be a difficult step. Here are a few tips. Place the mounting plate and spacer against the motor. Install the right bolt first making sure to place the lock washer up against the rear plate so that it will clear the nut holding the right bearing plate. Then insert the mounting bolt. If you are still having difficulty you can try removing the nut on the right bearing plate and back the clutch cover screw out so it is flush with the bearing plate and try reinstalling the motor mount bolts. You can then slide the nut back under the head of the motor mount bolt and tighten the clutch cover bolt and nut. We have also include a set of button head screws to be used either as the lower right bearing plate bolt or right motor mount bolt if this will help with installation.



Note: The holes in the motor mount plate and aluminum spacer are tight for a reason. Any enlargement of the hole can cause chain misalignment. Removing excess powdercoat from the rear mount plate is OK. You should then be able to start the threads and as you tighten them it will draw the bolts into the holes. Also notice these holes are not square to the rest of the mount. This is also for a reason. As your motor twists due to the torque it will straighten itself. It is also wise to preload your motor mount plate prior to installing the bracket in the next step. To do this slightly loosen the 2 motor mount bolts and place a flat screwdriver between the upper clutch cover bolt and the notch in the motor mount plate. Use the screwdriver to attempt to straighten the motor mount plate and then tighten the bolts.

5. Install small bracket.

Place the small aluminum bracket against the right bearing plate and rear motor mount plate. Note the holes in the bracket are not symmetrical, one hole is approximately in the middle of the bracket and one is closer to the edge. The one that is closest to the middle should be up against the right bearing plate and the one closest to the edge of the bracket should be against the motor mount. Align it with the opening cut in the motor mount for the clutch cover bolt.



Mark hole in right bearing plate using the holes in the bracket as a template. Remove the bracket and drill 11/64 inch (4.5 mm) hole. Attach the bracket using the supplied hardware.

Once the bracket is tightened against the right bearing plate drill the hole in the rear mount plate through the hole in the bracket. Install the remaining bolt.

6. Reinstall engine on bike.

Use normal engine installation logic, except the rear mount will be with dual u-bolts around the seat tube and through the rear mount plate. Do not tighten the engine mount nuts yet. You will need to make adjustments later, to properly tension the chain, for example. If you have a 1 1/4" seat tube you may need to widen the clamp bracket slightly.



Here is a tip from Sick Bike Parts

Now that you are not using the stock rear mount strap. You can enlarge the 2 holes to match the U-bolt on the clamp. Slide the U-bolt through the holes and use the stock mount strap to provide extra support for the lower clamp. We choose the lower clamp since your seat tube does not have the added support of the seat post and may crimp if excess force is applied. This is especially true of aluminum frames.

Step 10

Jackshaft installation

Carefully lift the partially assembled jackshaft into place in the right bearing plate hole, hold in place and assemble the chain onto the sprocket. If you are using a master link it is not necessary to put the retaining clip on at this time but when you do ensure that it is put on in the correct direction. The closed end of the master link clip should be pointing toward the direction of rotation.



Install left mounting plate onto the bearing, and install left plate over the sprocket cover. These bolts should be snug but no need to torque them as they will soon be removed.

Ensuring that the left bearing ring is seated to the bearing plate and the washer and sprocket are also flush against the bearing, slide your lock collar up against the bearing on the right bearing plate and lightly tighten the set screw. It is advantageous to align the set screw up with the keyway on the shaft.



Install the small sprocket and key onto the right end of the shaft with the hub toward the center of the bike. Align it with the outer most chainring. Lightly tighten the set screw that is not over the key.

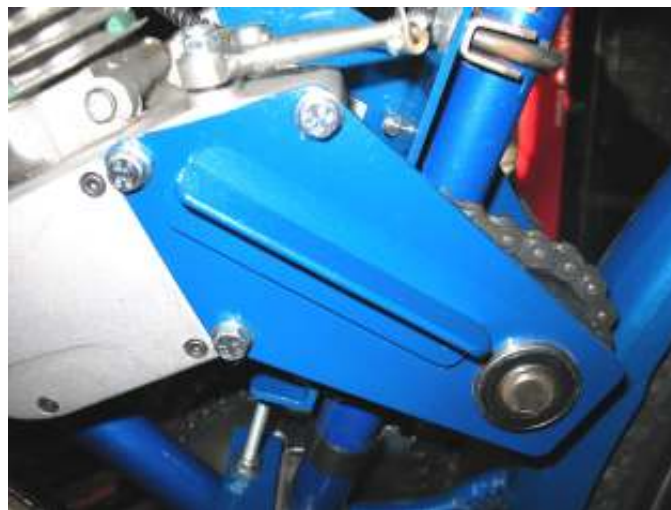
Just a note on the small sprocket to large chainring alignment: It is recommended to offset the small sprocket slightly to the right of a true straight alignment with the large chainring. This will accomplish 2 things. It will increase the gap between the 2 chains reducing the chance of them touching when in high gear and will keep the jackshaft from trying to be pulled to the right under high load.

Remove the left bearing plate, the right side sprocket and jackshaft assembly.

Disassemble the jackshaft assembly and file flat spots onto the shaft where the set screws left marks.



The flats do not have to be large but should be wide enough to allow lateral adjustment. Once this step has been completed reassemble the jackshaft like before. Connect the engine chain with the master link and install the left bearing plate.



Re-adjust the left sprocket and lock collar as necessary ensuring that there is 1/8 inch of shaft protruding from the left bearing. Remove the set screws and apply thread locking compound then tighten the set screws. Do not tighten the right sprocket yet.

Step 11

Right side chain installation

Your engine should be loosely mounted to the frame at this point. The front stock mount should be very loose and the U-bolts on the rear mount should be just loose enough to allow the engine to slide along the seat tube.

1. Force the engine down as far as you can by pushing on the rear mount. Make sure the U-bolts are not getting hung up not allowing the motor to move.

2. Drape your new bike chain over the small sprocket with one end of the chain hanging about 4 inches down toward the rear of the bike. Wrap the remaining chain around the large chainring and up to meet the other end. Now you need to decide how much chain will need to be removed. It may be better to go too short at this time than too long, however never overly force the chain on, you can damage the chain and freewheel.
3. Shorten your chain as required. **Do not use the included masterlink with this chain.** Although the chain is of good quality the masterlink will not hold up and can cause some interference. Use a chain breaker to shorten the chain as necessary.
4. Install the chain, the best method for this is to fully assemble the chain, place it inside the chainrings and onto the small jackshaft sprocket. Once it is on the small sprocket, start placing it on the front of the large chainring and slowly start turning the cranks until the chain has been installed. It will take some force to do this and your clutch on your engine will need to be disengaged so that the sprocket can rotate.

If your chain is loose after it has been installed, it may be too long. If it is only a little loose you may be OK.

Step 12

Install the third clamp and lower adjuster bracket as shown below, it should be resting on your down tube and be sure to leave this loose.

Measure the distance between the parallel flat surfaces of the lower adjuster bracket and the lower plate on the rear motor mount.



Add 1.5 inches to your measurement and cut the adjuster rod to that length

Note:

If you are not used to cutting threads you may want to put the 4 nuts in the middle of the rod so you won't have to try and thread them onto an unfinished threaded end

With the 4 nuts close to the middle of the rod, add a washer (not shown in photo) to the top and bottom of the nuts

Slide the rod into the hole of the lower motor mount bracket

Position the lower adjuster as seen in the photo and slide the other end of the adjuster rod into the hole

Start threading the outer most nuts toward the adjuster brackets until they almost touch

Position your lower adjuster bracket and clamp against the bottom tube and tighten the clamp bolts

Thread the remaining two nuts toward the two outer nuts

Tighten the upper two nuts against each other using 2 wrenches so they won't loosen

With your two motor mount clamps just loose enough for your engine to slide, start threading the lower nut against the bottom adjuster bracket until your chain becomes tight. Your chain should never have more than $\frac{1}{4}$ inch of slack in either direction. When you start running your bike, the force on the motor will twist it slightly and loosen the chain. You will find that you will probably have to adjust your rear mount two or three times until everything settles and the chain will remain tight. **Remember to loosen your front mount substantially before trying to adjust your rear mount.**

Tighten the remaining lower nut on the adjuster rod against the lower nut with two wrenches to keep it from coming loose.

NOTE: it is best to start with your chain tight as it will loosen when riding.

Tighten your rear U-bolt mounts and your front mount. If you have more than $\frac{1}{8}$ inch of space between your frame and your front mount you may want to rethink your front mount or your chain is too long so your motor has to be placed high on the seat tube to tighten the chain. You can space your front mount or try removing a link from your chain and readjust your engine. After tightening your mounts, ensure that the chain remains tight. If you cannot find a good combination of chain length and engine adjustment you may need a half link. These can be purchased on our website.

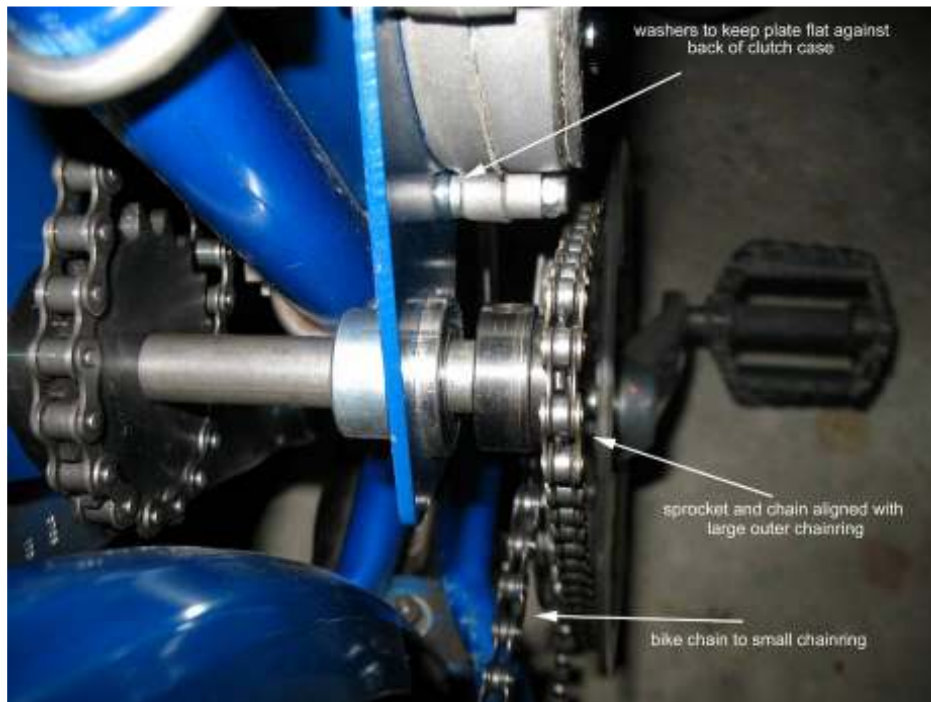
Step 13

Right side jackshaft sprocket alignment

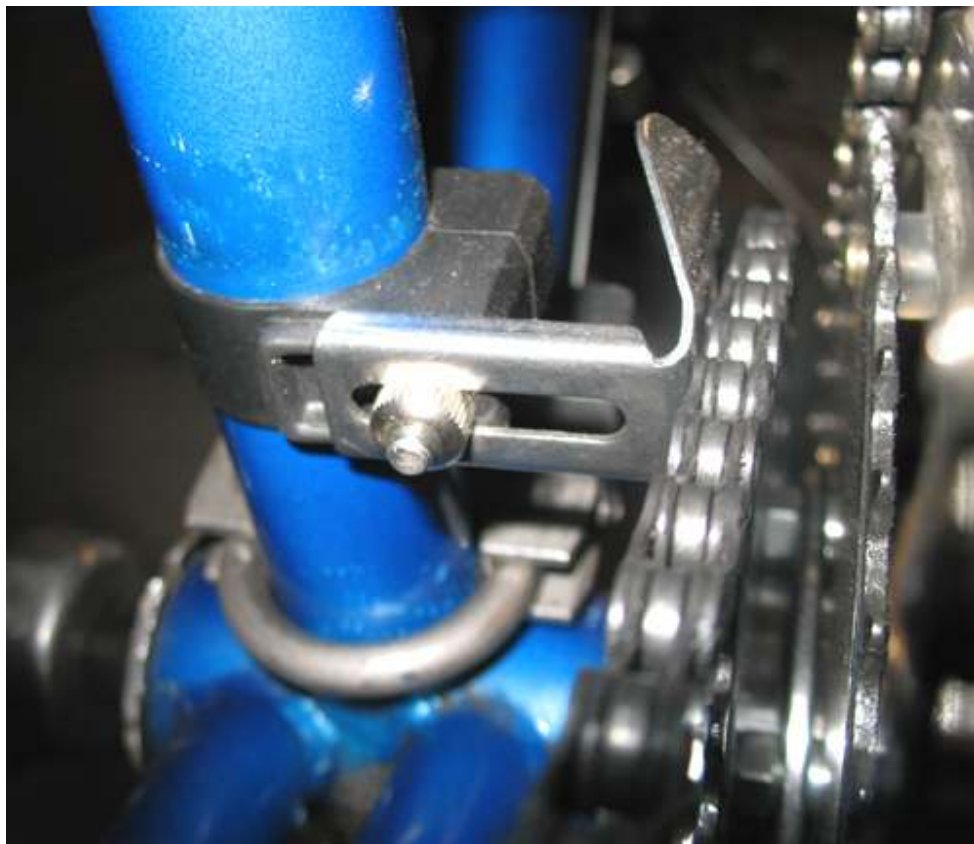
Measure the distance from your seat tube to the outer chainring, with a 1.125 inch seat tube it should measure close to 1.75 inches.

Measure the distance from your seat tube to the teeth on the small jackshaft sprocket. It should measure no less than your previous measurement. It is actually good to run the small jackshaft sprocket with about .125 to .250 larger measurement or outside true alignment with the large chainring.

Once the small jackshaft sprocket is correctly aligned, remove the set screws, apply thread locking material and tighten the set screws.



Install your bike chain to the small front chainring and adjust the Jump Stop chain guard. The chain guard should be parallel to your chain with about half of the guard sitting above the chain and there should be about 1/16 inch (1.5mm) clearance to the chain.



Step 14

Plastic Chain guard installation

1. Test fit the two pieces on your engine ensuring that when the 3 holes line up, the chain guard is protecting the small sprocket.
2. Insert the 3 T-nuts into the back side of the plastic clutch cover plate using a hammer to get them as flush as possible.
3. Clean your clutch cover with brake clean or rubbing alcohol to remove any oil or grease.
4. Apply a thin coat of contact cement to the engine clutch cover and the backside of the plastic clutch cover plate. The backside is the one with the large portion of the T- nuts showing.
5. Allow the contact cement to set up according to the manufactures instruction and place it on the clutch cover.



6. Install the chain guard by screwing it to the clutch plate.



Operation

Your first ride

Take your bike out for a spin under pedal power. Make sure that everything is moving feely and that your shifting mechanism is working correctly. After a few minutes pedaling, double check that all your hardware is tight and check your chain tension. Readjust as necessary. You may find that in your top gear that the 2 chains get very close to each other. Pay close attention to this. Each bike is different and due to many factors these chains may touch which is an unacceptable condition. To increase the clearance you can try a few things. You can increase the space between your rear cassette and chain stays by adding a spacer to the right side of your axle and remove the same amount of space from the left side of the axle which will move the cassette closer to the center of the bike. You can also add a washer in between the front freewheel and the large front chainring to each of the 5 bolts which will space the chainrings farther away from the other. You can also adjust the small sprocket on the jackshaft farther away from the center of the bike, you can move this pretty far out of alignment before you run into problems with the chain.

Starting your engine

The first thing you will notice when trying to start your engine is that it is different than it was before. You can no longer just get the bike moving and release the clutch. You now have to pedal to start the engine. This will seem strange at first but it won't take you long before you figure out a good technique for starting your engine. Here is our suggested method. Pedal your bike with the clutch in to get it moving at a decent pace in 1st gear, prop the crank for your preferred leg up at about 45 degrees, release the clutch, get out of the saddle and put your weight on the pedal of that crank, as the engine starts to turn keep pedaling through. Once the engine starts to turn over it is pretty easy to continue pedaling. Do not jump on your pedals to start your engine. This puts excessive force on the freewheel and may cause it to fail.

Shifting

When attempting to shift your bike for the first time we recommend you back off the throttle slightly before making a shift. This will relieve a little force from your derailleur and allow smooth shifts. Also be sure to roll the throttle back on slowly. Due to the slack that exists in the chains combined with the 2 freewheels your engine can free rev for a split second as you add power after a shift. This can cause excessive force to be applied to the drive train and cause damage to your rear axle, hub or cassette. With some practice you will be able to shift quickly and not overly stress the drive train.

Remember to downshift when coming to a stop. Using your clutch is only required when starting or stopping. It is a sure way to kill your engine if you attempt to start from a stationary position and find yourself in 6th gear instead of 1st.

Be sure to only ride for a few minutes and then double check all your hardware and chain tension. As was mentioned previously, the chain from the jackshaft to the chainring will need to be readjusted a few times as your motor settles.

Other operating tips

We highly recommend the following for safe operation.

A grip shifter or “rapid fire” shifter is an excellent addition to ensure safe operation of your motorized bicycle. It allows you to up-shift and down-shift easily without taking your hand off the handlebars.

A dual pull brake lever is also highly recommended. It will clear your bars up and allow easier access to your shifter.

Here is an example of a handlebar layout.



Maintenance

This kit is relatively maintenance free but you should maintain your chains, derailleur and front freewheel. Keep your chains clean and use appropriate lubrication on them, do not use WD-40 on chains. Keep all moving parts of your derailleur especially the idler sprockets clean and well lubricated. Your front freewheel should also be lubricated periodically. We recommend that you follow our Freewheel maintenance instructions found on our website.

Parts list

Item	Description	Qty
1	Crank L & R & Freewheel	1
2	Bottom Bracket Spindle	1
3	36t Sprocket	1
4	44t Chainring w/chain guard	1
5	5/8" x 5.25" Jackshaft	1
6	5/8" Bearings	2
7	5/8" Lock Collar	1
8	17t Jackshaft Sprocket	1
9	10t Jackshaft Pinion	1
10	5/8" Bearing Washer	1

11	Bearing Bracket L	1
12	Bearing Bracket R	1
13	6mm x 35mm Left Bracket Bolts	3
14	6mm x 30mm Right Bracket Bolts	3
15	6mm Lock Nuts	2
16	6mm Nut	6
17	6mm Washers	6
18	Bike Chain	1
19	Rear Motor Bracket	1
20	1 1/8" Muffler Clamp	2
21	Motor Bracket Spacer	1
22	6mm x 35mm Rear Bracket Bolts	2
23	6mm split lock washers	2
26	Clutch cover	1
27	Upper chain guard	1
28	6-32 T-nuts	3
29	6-32 x 1/4 screws	3
30	Jump Stop chain guard	1
31	5mm x 25mm sprocket bolts	5
32	5mm washer	5
33	5mm lock nut	5
34	6mm shim washers	3
35	3/16" x 3/16" sprocket key	2

Contacts and additional information

For questions or comments visit us at:

www.sickbikeparts.com

For additional information on Motorized bicycles go to:

www.motoredbikes.com

www.motorbicycling.com