

# Sick Bike Parts.com

## 4 Stroke Shift Kit Installation Instructions

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 match all parts to the parts list. Parts List Attached.

This is a kit and every attempt was made to make it as universal as possible, 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 pedals, crank arms, and bottom bracket spindle from bike.
2. Install replacement bottom bracket.
3. Install new chain rings and front freewheel.
4. Install motor assembly to bike.
5. Assemble jackshaft and install.

6. Reinstall engine on bike.
7. Hook up shortened engine chain on engine side.
8. Install bike chain on the right side.
9. Make sure all connections are logical, all fasteners are tight and chains are properly tensioned.

Your motor mount comes powder coated and does 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  
Screwdrivers  
Allen wrenches  
Sockets and or box end/open end wrenches  
Thread locking material (such as Loctite)  
Sand paper and files  
Other hand tools as needed

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

### **Step 1**

1. Remove engine and old motor mount.

### **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. Remove old bottom bracket assembly.

### **Step 3**

1. Reinstall new bottom bracket. This requires a special splined bottom bracket tool. Detailed instructions on removing and installing a cartridge bottom bracket can be found at <http://bicycletutor.com>.
2. Install the new left side crank. Do not over tighten the nuts.
3. Install your freewheel to the freewheel hub by screwing it on in a clockwise direction. A black washer is included that is to go on the hub before the freewheel. Note there is a small groove on the ring and should go up against the freewheel. This is to ensure that the freewheel does not unscrew. Be sure to center this ring before you tighten the freewheel.



4. Test fit the freewheel hub and freewheel to the crank spindle with the supplied key. Make sure that they fit and can be slid along the shaft to allow for adjustment later.
5. 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.
6. Place the large chainring over the hub and on to the freewheel.
7. 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.



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



9. 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.



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. Slide the freewheel hub and chainring assembly on to the crank spindle. Do not forget the key. **Be sure to put your bike chain around your bottom bracket before you install the freewheel assembly. Do not put the chain onto the chainring yet.**
13. Install your right crank to the spindle.
14. The bottom bracket and chainring assembly should be complete.
15. For freewheel maintenance, visit our download page.

## Step 4

### Motor mount installation

1. Hold the front mount plate up to your frame level with the ground. Check that the front mount tab is parallel to your down tube. If it is not then adjust this angle by placing the mount tab in a vice and bend it until it is parallel with the down tube and the mount is parallel to the ground.



2. Assemble the front mount plate to the motor mount using one of the 6 mm cap screws, flat washer and lock washer. Do not fully tighten this bolt. The two plates should be able to slide on the adjuster slot.



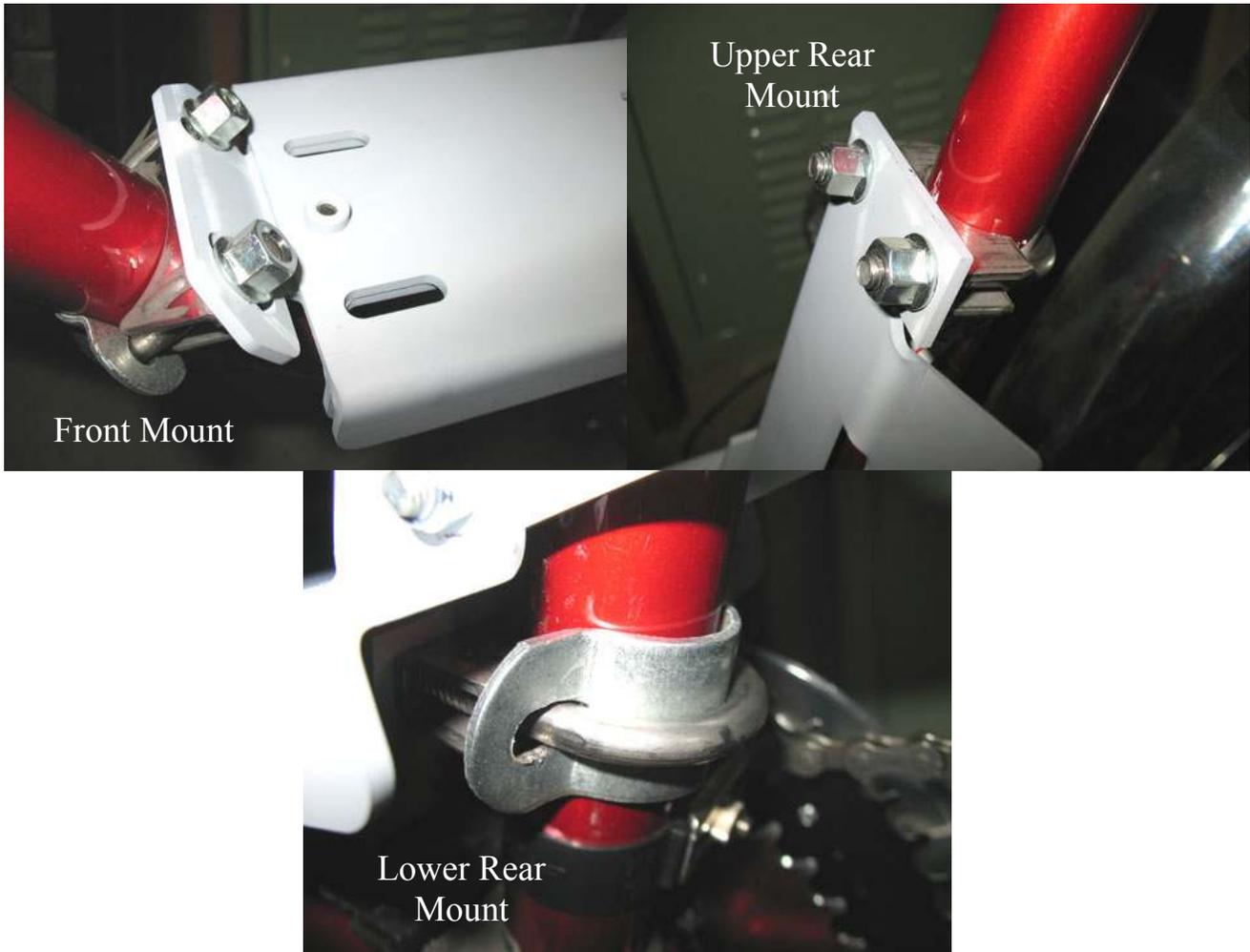
3. Assemble the rear mount to the motor mount using the 6 mm hex head bolts, washer and lock nuts. Insert the bolt from in between the rear mount and install the washer lock nut to the outside. Repeat on the other side. The chain adjuster tab should be below the mount. Do not fully tighten these yet. The rear mount should be able to rotate on the bolts. Note the 2 cap screws are put in the rear slots just to keep things aligned as we continue assembly.



## Step 5

1. Install the completed mount assembly to the bike using the supplied clamps. It is a good idea to support the U bolt as shown in the photos below using the old clamp straps. You will need to drill out the old straps and elongate the holes to get them to fit the U-bolt. This is not necessary on steel frames but a must on aluminum frames. Adjust the length of the mount by sliding the front mount out or in to the motor mount

so that when complete, the motor mount is sitting parallel to the ground and typically as low in the frame as possible. Do not tighten down the clamps completely as we will need to be adjusting the mount position for chain installation.



## Step 6

### Jackshaft Assembly

Arrange 5/8" shaft, sprockets, keys, washers and bearings for assembly on shaft.



Sand and file the shaft, sprockets and keys as necessary 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 the bearings into the rear mount plate so that snap ring sits against the plate and the narrower side of the bearings is to the outside. You may need to sand or file the holes for the bearings to fit.
2. Insert the axle into the bearings and center it so the same amount is exposed on either side of the bearings.
3. Slide one of the thin washers over the shaft to the bearing on each side.
4. Install one of the larger washers up against the thin washer on each side.
5. Install the larger sprocket and key onto the left side of the axle with the hub side facing out.
6. Install the small sprocket onto the right side of the axle with the hub side toward the bearing. **Do not tighten the set screws yet. This will be done later.**



## Step 7

### Right side chain installation

Your motor mount assembly should be loosely mounted to the frame at this point. The front and rear U-bolts should be just loose enough to allow the mount to slide along their respective tubes.

1. Drape the 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.
2. 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.
3. A half link has been included to help you adjust the chain length more precisely. Use it if it provides better chain length.

4. Complete the chain when you have determined the correct length.
5. Slide the small sprocket off of the axle.
6. Install the chain by placing the chain around the large chainring and onto the small jackshaft sprocket. Once it is on the small sprocket, slide the small sprocket back onto the shaft.

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 8

### Chain adjuster installation

1. Install the third seat tube clamp and lower adjuster bracket as shown below, it should be resting on your down tube and be sure to leave this loose.
2. Measure the distance between the parallel flat surfaces of the lower adjuster bracket and the lower plat on the rear motor mount.



3. 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

4. With the 4 nuts close to the middle of the rod, add a washer to the top and bottom of the nuts.
5. Slide the rod into the hole of the lower motor mount bracket.
6. Position the lower adjuster as seen in the photo and slide the other end of the adjuster rod into the hole.
7. Start threading the outer most nuts toward the adjuster brackets until they almost touch.
8. Position your lower adjuster bracket and clamp against the bottom tube and tighten the clamp bolts.
9. Thread the remaining two nuts toward the two outer nuts.
10. Tighten the upper two nuts against each other using 2 wrenches so they won't loosen.

## Step 9

## Right side jackshaft sprocket alignment

Your right side sprocket should be resting against the washer. Slide your chainring assembly in or out on the bottom bracket spindle so that it is in line with the small jackshaft sprocket and your chain appears to be straight up and down. A good way to verify this is to measure the distance from your seat tube to the teeth on the large chainring and repeat the measurement for the small jackshaft sprocket. It should measure no less than your previous measurement. It is actually good to run the small jackshaft sprocket about .125 inches larger measurement or outside true alignment with the large chainring. You may add another shim washer or large washer to the jackshaft if you need to move the chain more to the right. Once you are satisfied with your chain alignment lightly tighten the set screw that is not over the key way on the jackshaft.



## Step 10

### Tie Bracket Installation

Install the tie bracket as shown in the photo using the 4 button head bolts and 4 lock washers.



## Step 11

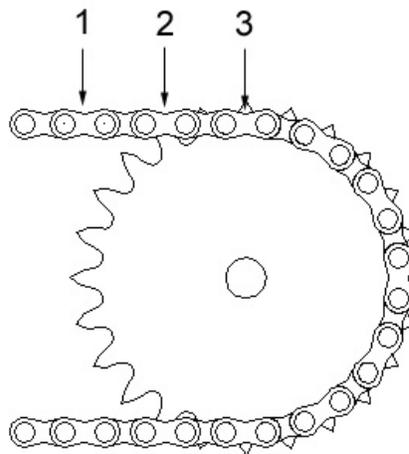
### Engine installation

Install your engine onto the motor mount using the four 6 mm cap screws, washers and lock washers. Leave these slightly loose so we can slide the engine to adjust the chain tension.

## Step 12

### Shorten engine chain

You will need to shorten the chain that came with your engine kit to 12 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). Due to the variances in frames and engine/gear box combinations 12 may not be right for your bike but it is a good place to start. Add or remove links as necessary, a half link may be required to get the length correct for your application.



## Step 13

### Engine chain adjustment

1. Slide your engine as far to the rear of the bike as possible.
2. Place your chain over the left jackshaft sprocket and onto the engine output sprocket.
3. Slide you engine forward to check the chain tension. If you cannot slide the engine far enough forward to tighten the chain or your engine is too far to the rear when the chain is tight you may need to add or remove a link, or half link to get the length correct.
4. Check for lateral chain alignment. You may need to add an extra washer or two behind the jackshaft sprocket to get the chain to align between the engine output sprocket and jackshaft sprocket. You may also run into some interference with the Tie-Bracket bolt. Filing the head of this bolt may be required but should be a last resort. Shimming the sprocket is a better option.
5. Once you are happy with your chain adjustment and alignment, lightly tighten the set screw on the left jackshaft sprocket that is no over the key way.

## Step 14

### Jackshaft final assembly

1. Loosen the set screws on the left and right jackshaft sprockets.
2. Remove the sprockets and slide the jackshaft out from the bearings.
3. Note the marks left on the shaft from the set screws. File flat spots in this area.



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.

Remove the two set screws from the two sprockets and the freewheel hub. Apply thread locking compound then tighten the set screws. Ensure the keys are properly aligned prior to installing the set screws.

**NOTE:** you may install the engine side chain but do not set the chain tension until after the next step.

## Step 15

### Right side chain tension adjustment

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 before trying to adjust your rear mount. You may also have to loosen the 4 motor mount bolts and front locator bolt and lengthen the overall length of the mount if your chain is too long.**

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. After tightening your mounts, ensure

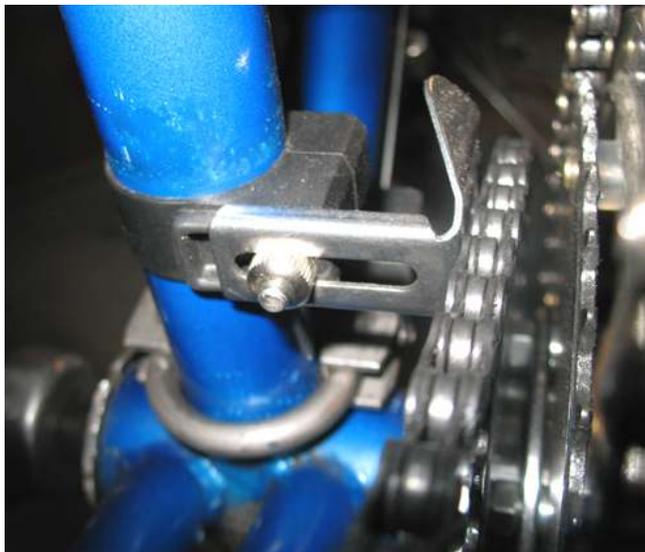
that the chain remains tight. If you cannot find a good combination of chain length and engine adjustment you may need to use the half link or simply change the chain length. These rear U-bolts need to be tight. If you find after riding and have readjusted the chain tension a few time you still cannot keep right side chain tight try inserting an additional seat post down your seat tube so that the seat tube has additional support all the way down the tube. This will allow you to tighten the clamps without fear of crushing the seat tube.

It is now OK to adjust your engine to adjust the chain tension on the left side chain.

## Step 16

### Jump Stop adjustment

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.



## 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.

## 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. It is a sure way to kill your engine if you attempt to start from a stationary position and find yourself in 6<sup>th</sup> gear instead of 1<sup>st</sup>.

**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 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.

## 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
<b>Purchased parts</b>		
1a	Crank L	1
1b	Crank R	1
1c	Freewheel	1
2	206 mm Cartridge Bottom Bracket	1
3	30t Sprocket	1
4	48t Chainring w/chainguard	1
24	5mm x 25mm sprocket bolts	5

25	5mm washer	5
26	5mm lock nut	5
27	6mm Nuts	5
5	5/8" x 5.25" Jackshaft	1
6	5/8" Bearings	2
8	17t Jackshaft Sprocket	1
9	9t Jackshaft Pinion	1
20	5/8" Bearing Washer	3
30	5/8" Shim Washer	4
29	3/16" x 3/16" x .75 key stock	2
16	BMX Half link	1
17	415 Half link	1
7	Freewheel Hub	1
28	1/4-20 x 3/8 SS	1
29	3/16" x 3/16" x .75 key stock	3
10	Motor Mount	1
11	Front Mount	1
12	Rear Mount	1
13	Bike Chain	1
14	? Muffler Clamp/Front Mount	1
15	1 1/8" Muffler Clamp	3
18	Jump Stop	1
19	Height Adjuster bracket	1
31	1/4 Hex Nuts	4
32	1/4 Washers	2
33	1/4-20 x 6" Allthread	1
37	Tie-Bracket	1
38	6mm x 14mm button head bolts	4
39	6mm lock washers	4
21	6mm Lock Nuts	2
22	6mm Washers	7
23	6mm split lock washers	5
34	6mm x 15mm SHCS	1
35	6mm x 20mm SHCS	4
36	6mm x 20mm HHS	2

For questions or comments visit us at:  
[www.sickbikeparts.com](http://www.sickbikeparts.com)

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