

Installation of Chain and Sprocket Set

Brought to you by:
Sum Of All Parts Technical Support Staff

Installation and Maintenance Brief

- In this document you will learn how to install and maintain your new Sum Of All Parts chain and sprockets.
- You will also learn how to maximize the value of your new performance product
- And finally- you will learn how to maintain a chain and sprocket set properly for maximum return on your investment.

Overview

There are many pieces to a drivetrain system- and it is only as strong as it's weakest link so all are important.

Below are some of the components and Vocabulary

- **CHAIN-** the chain is the primary component in a late model sportbike drivetrain. The chain is normally made of high strength steel with tensile strength ranging from 2000 pounds to over 15,000 pounds. The Chain consists of Side Plates, inner plates, X-rings and links
- **Rear Sprocket-** performance sprockets are made of 7075 Billet Aluminum and come in a range of sizes specific for your bike. It is the larger of the two sprockets.
- **Front Sprocket-** made of High Strength, Low Alloy Steel and normally ranging from 13 to 18 teeth in size. Normally GOLD or BLACK in color. The front sprocket is usually attached to the engine and attached with a 32mm nut.
- **Links-** all chains come with either a rivet, clip or screw-type link.
- **Tools-** you will need common metric hand tools to install a chain and sprocket set.
- **Specialty tools-** some Chain and sprocket sets require specialty tools, especially those requiring a rivet style link.
- **Chain lube-** lubricates the links of the chain, all chains (even the quality X-ring chains we sell) require frequent chain lube to last the 20,000+ miles they are capable of.
- **Final Drive Ratio-** the final drive ratio is complex but essentially it means that for every ONE revolution of the REAR sprocket, the front sprocket must revolve X.XX times. The HIGHER the X.XX number, the lower the gearing and the faster the bike will accelerate (up to a point) Most modern sportbikes have a FDR between 2.5 and 3.5.

PREPARATION

- Prep work is key to easy and proper installation
- Have clean hand and power tools and all appropriate items before starting the installation
- This is an easy job, if you take your time and ask any questions you may have
- Do not attempt this job if you have trouble with hand tools, power tools or heavy equipment. Changing a chain and sprocket set can be dangerous if you are not comfortable with the tools.
- **CLEAN CLEAN CLEAN.** The cleaner your wheels, chains, motor, engine, tools, old sprockets, tires and chain guards are, the easier this will go. WE suggest washing the bike and rear wheel with simple green prior to installation and giving your hand tools a nice cleaning at the same time. Chains are GREASY and motors are OILY. Not a good combination!

NECESSARY TOOLS

- You will need at least the following:
 - Metric socket set, ranging from 8mm to 22mm
 - Flathead and Phillips screwdrivers
 - Allen head assortment (some bikes require none)
 - Needle nose pliers
 - 32mm socket (some bikes use a bigger nut on the front sprocket)
 - 10mm, 12mm, 14mm and 17mm wrench OR a quality crescent wrench
 - Rags (they will get ruined) and gloves
 - Chain Lube, WD40 and/or axle lube (Chain Wax acts as all three)
 - Some way of getting the rear tire off the ground (Rear stands are available through Sum Of All Parts and a very good idea to have if you do your own maintenance)
 - Magic Marker
 - Hammer
 - Locking pliers, needlenose and vicegrip pliers



The following tools are also very helpful

- A mini-press and mini-breaker combo (available through Sum Of All Parts)
- Dremel tool kit or a die-grinder or a hand rasp.
- Rivet tools (also available through Sum Of All Parts) are about \$85 and required for 1000cc+ bikes using rivet links.
- Torque Wrench is required for some bikes, always consult your Service Manual for Torque specs.

FIRST STEP-Organize & Inventory

- Organize area with all tools, chemicals and components
- Have everything you need ready when you begin. The process of changing the entire drive train is about a 2 hour event, if you have the correct tools in place it takes much less time.
- Take a “reality inventory”
 - Do you have the bike?
 - Do you have the tools?
 - Do you have the components required for your particular application?
 - Do you have 2-4 hours at your disposal?
 - Do you have a friend or partner than can help for about 5 minutes?
 - IS everything prepped and clean? If so- move on to the next step!

STEP TWO-Prep!

- Organize immediate area with all tools, chemicals and components.
- Have everything you need ready when you begin. The process of changing the entire drivetrain is about a 2 hour event, if you have the correct tools in place it takes much less time.
- Place the motorcycle on a flat, level surface. Figure 2.1 & 2.2 Put the motorcycle on a rear stand or the center stand. Kick stands won't work!



Figure 2.1



Figure 2.2

- IS the bike level, secure and is the rear wheel off the ground? If so-move to step 3!

STEP THREE-Removal of front sprocket

•With the rear wheel and tire off the ground- remove any bodywork, chain guards, fenders, fairings, sprocket covers and speedometer pickup assemblies. Every bike is different- just make sure you have easy access to the front sprocket, chain and rear sprocket. See Figure 3.0 and 3.1 below



Figure 3.0- prior to removal of guards and plates



Figure 3.1- after removing all components around front sprocket and bending back retainer clip

- Remove the retaining ring from the front sprocket with screwdriver (soft metal ring around nut) See Figure 3.1.
- Place a STURDY 1 to 2 feet long stick, bat, breaker bar ANYTHING long enough to slip through the rear wheel and brace against the swingarm. Have a partner hold the bar in place for the next step. See figure 3.2 and 3.25



Figure 3.2



Figure 3.25

- Remove any crush-washers or bending tabs off the front sprocket. See figure 3.1.
- Using a large socket (normally a 32mm) and ratchet, remove the nut holding on the front sprocket. See figure 3.3 Have your partner hold the bar on the rear wheel firmly- the front sprocket nut is the highest torque nut on the whole bike and normally requires a tremendous amount of force to break loose- especially if your chain and sprockets are badly worn or damaged. Use a breaker bar on the socket if necessary. (NOTE. Check the threads prior to removal- a very small percentage of KTM and some other bikes use a counter-thread and require clockwise loosening)



Figure 3.3

- Do not remove the front sprocket off of the bike yet. Proceed to step 4.

STEP FOUR -Removal of the Chain

- Check to make sure the bike is still firmly on the rear stand. See figure 2.1 and 2.2.
- Attempt to find the OLD master link if you can- it's just easier to cut the chain on the OLD master link. If you can't find it- that's okay. Mark the link you choose to cutoff with a marker. See figure 4.1



Figure 4.1. Mark a link you wish to remove with a magic marker

•Using a die-grinder, hand rasp or dremel tool- CUT OFF both heads of the selected single link. See Figure 4.2 and 4.25 **NOTE: Alternatively, if you are REPLACING the chain you can cut through both outer links and throw the chain away. This generally requires a die-grinder or a good Dremel tool.**



Figure 4.2- one rivet head removed and 4.25 with both rivet heads ground off w/ a tool.

•Normally most folks find it easiest to have the chain resting on the rear sprocket so that it is stable and doesn't flop around. See figure 4.2 and 4.25

•After you have removed the head of the links- you will need to push the link THROUGH the outer and inner links. This can be done with an awl, sharp screwdriver or punch and a hammer. ***NOTE if you purchased the chain breaker this step is much easier and detailed instructions on how to use this tool are included with the tool. See Figure 4.3 and 4.35**



Figure 4.3 – you can use the press or a hammer and awl. Make sure the chain is on the sprocket at the time of removal if using a hammer and awl.



Figure 4.35 shows one rivet head pushed through and one about to be removed.

- Remove the chain, by pulling it through the front sprocket area. Discard chain if replacing. See figure 4.4 and 4.45



Figure 4.4 shown with link removed



Figure 4.45 shown with chain pulled through and removed.

- After removing the chain and front sprocket nut all the way- firmly tap the sprocket in towards the crank case to loosen it from the spline shaft. See Figure 4.5 Remember- every horsepower, every wheelie, race, track day mile and abuse you have put on your bike has gone through this very small sprocket- so it may be stubborn. NEVER pry the sprocket off.



Figure 4.5



Figure 4.55- sprocket removed

- Front sprocket should come off of the spline. See figure 4.55 DO NOT THROW the sprocket away! You may need it for alignment purposes, so mark the side facing you with an “x”

STEP FIVE -Removal of the Rear Wheel and Rear Sprocket

- Check to make sure the bike is still firmly on the rear stand. See figure 2.2
- With the bar between the rear wheel and swingarm OR with a partner applying the rear brake- remove the axle nut holding on the rear wheel. See figures 3.2 and 3.25
- Remove the axle, taking special note of the order in which spacers, covers, caliper brackets, brake pads and adjusters are installed. We HIGHLY recommend taking a close-up picture of the rear wheel if you are unsure of how to uninstall (or more importantly install) this component. See figure 5.1 and 5.15

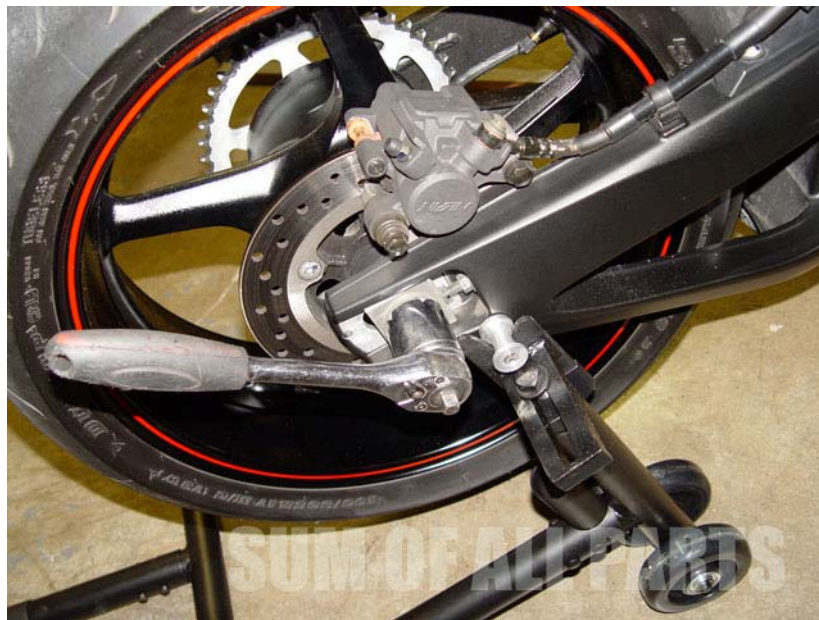


Figure 5.1



Figure 5.15 with axle nut and chain adjuster block removed

- The rear wheel on all bikes except the Ducati 748/916/996/998 will now come out of the bike. Ducati motorcycles need to reference their service manuals for removal of the rear wheel. See figure 5.2



Figure 5.2- rear wheel removed

- Place the rear wheel on the ground ROTOR SIDE FACING DOWN. See figure 5.3



Figure 5.3

- Using a 17mm socket remove each of the 5 or 6 nuts and washers that are holding the old sprocket to the sprocket hub. See figure 5.4 It's easiest to keep the hub on the wheel in order to remove the nuts and washers. DO NOT DISCARD these nuts or washers. See figure 5.45



Figure 5.4 remove 17mm nuts from rear hub



Figure 5.45- keep all these parts

- Discard the rear sprocket. Removal of the old components is now complete. See figure 5.5



Figure 5.5

STEP SIX –Installation of the new components

- Check to make sure the bike is still firmly on the rear stand.
- Put the rear sprocket (pretty side out) on the hub. See figure 6.1. Install washers and 17mm nuts, tighten to OEM torque specs (most are 85# for reference) USING A STAR-CROSS PATTERN. See Figure 6.15 Reinstall the rear wheel operating in the reverse order from Step 5. Reinstalling the rear wheel generally requires 2 people.



Figure 6.1 tighten nuts



Figure 6.15 tighten bolts in a star-cross pattern making sure to not over tighten.

- Remove the front sprocket from the packaging- taking special note to physically count the number of teeth- do not rely on the packaging! See figure 6.2



Figure 6.2 COUNT THE TEETH! Make sure it matches the # for your kit.

- Spray a light coating of WD40 or Chain lube on the inside of the front sprocket splines. See figure 6.3



Figure 6.3- use a light lubricant on the INSIDE of the front sprocket

- Slide the sprocket on the motor countershaft spline- with the FLAT side of the sprocket FACING INWARD towards the motor. THIS IS INCREDIBLY IMPORTANT! See figures 6.4 and 6.45



Figure 6.4- front sprocket installed



Figure 6.45 shown from behind. FLAT part IN.

- Replace any flex washers, crush washers or clips from step 3. See Figure 6.5



Figure 6.5

•Place the 32mm nut back on the spline **but do not attempt to tighten it yet**. See figure 6.6 (You will just turn the motor over) This is the last nut that should be tightened prior to installing the bodywork back on the bike.



Figure 6.6- do not tighten front sprocket yet!

STEP SEVEN –Installation of the chain

- Check to make sure the bike is still firmly on the rear stand. Installation of the chain is the most complex and difficult part of your job. Take your time, don't take shortcuts, and pay close attention to anything that "just doesn't look right."
- If using the OLD chain- make sure you have the correct sized master link for your bike.
- Installation of the NEW chain- thread the chain around the front sprocket from the bottom. See figure 7.1, 7.2, 7.3 and 7.4



Figure 7.1- line up the rear chain on the rear sprocket



Figure 7.2- run chain through towards front



Figure 7.3 wrap chain around front sprocket



Figure 7.4 continue and wrap chain back towards rear

NOTE-Depending on your gearing chosen, you can find this to be very easy or very difficult.

•Wrap your new chain around the rear sprocket- the chain should be FAR too long this is OKAY! See Figure 7.5



Figure 7.5 chain will be far too long- just let it hang for now

•Move the rear wheel chain adjusters as far forward as they will go or within the factory “lines” on the swingarm. It’s better to be further forward so you can maximize the life of your system. Pay close attention to the alignment. Tighten the rear axle to factory specs. See figure 7.60 and 7.65



Figure 7.6-move wheel to your preferred riding style



Figure 7.7 tighten rear wheel

•Wrap the chain around both sprockets and mark the point where the closest TWO MALE (INNER) links meet. See Figure 7.8 This can be tricky-but just remember that a LINK is a female (outer link) and must meet a male link on either side to form the connection.



Figure 7.8 Mark the link to be removed with a black X to indicate removal.

•Remove the chain. Using a dremel tool, remove the FEMALE link head on the longest side of the chain. See figure 7.85, 7.86 and 7.87 and 7.88 for mini-press application. Remove the left-over links and put them aside. This is very similar to the process in Step 4.2 to 4.5. Wrap the chain back around the sprockets. See figure 7.89



Figure 7.85



Figure 7.86 grind off heads



Figure 7.87 both heads removed



Figure 7.88 Removing the extra links

The chain is now cut to length and should look like this:



Figure 7.89 showing inner plate ready to link

- You now have the chain prepared for the installation of the connecting rivet or clip link.

STEP Eight –The Masterlink

- Check to make sure the bike is still firmly on the rear stand. Installation of the chain is the most complex and difficult part of your job. Take your time, don't take shortcuts, and pay close attention to anything that "just doesn't look right." Installation of the link is MUCH easier if you have the correct tools for your application.

- What kind of MASTER link do you need? There are three kinds- rivet (common but not required for all 1000+CC sportbikes) CLIP (common but upgradeable to all 400+CC sportbikes TO a Rivet link) and SCREW- uncommon and only applicable to EK chains. We supply the most appropriate link for your application under all circumstances. You can CHOOSE to use either a rivet link or a clip link with all of our kits. Additional links carry a \$10 charge. They are also available at most local dealerships.

- There are 3 or 4 components to a master link: 1) LINK-shaped like a "U" with two posts coming through the plate 2) Outer plate- shaped like a figure-8 3) X-rings- pre-lubricated. 4) Clip style links also have an outer clip shaped like beak of a bird.

Step Nine- Installing the Masterlink, clip or rivet.

- With the chain wrapped around and meeting on the rear sprocket- remove the MASTER LINK from the plastic bag. See figure 9.0 Place 2 X-rings on the link posts so that they are flat against the side plate. See figure 9.1



Figure 9.0 the master link package



Figure 9.10 place two X-rings on the posts as shown

•Put the link on the back side of the chain- with the two posts facing you. See figure 9.2 for clip-link. See figure 9.22 for rivet link. The link should protrude through the two inner links with appx 3 mm showing. See figure 9.2



Figure 9.2 – push the clip link all the way through the chain as shown



Figure 9.22 with X-rings installed on Rivet link

•Place 2 X-rings on the posts and place the Side Plate over the rings and posts see figure 9.22

•RIVET LINK: You must use the pro tool kit to install the rivet link. Using the instructions included with the pro tool kit- install the rivet link. The directions for installing the rivet are very clear. See figures 9.30, 9.31, 9.32 and 9.33



Figure 9.30 – press the plate on firmly with Channel Locks.



Figure 9.31. Using the professional press- tighten the links together.



Figure 9.32 Tighten with a 14mm wrench until 3mm are left protruding.

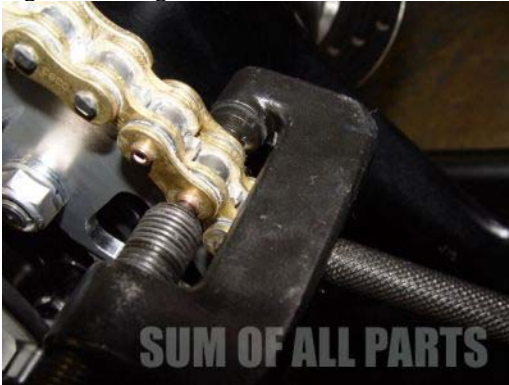


Figure 9.33- alternating rivets between rotations- use the RIVET MAKER to flare out the rivets. When you observe light cracks in the rivet- they are set properly and you are done. Always follow the tool kit instructions for connecting the links.

•**CLIP LINK:** There are two methods.

•Clip Link, using a vice grip pliers set. Ratchet the side plate down the posts slowly, making sure to not crush the rings. When the groove from the posts are visible- stop ratcheting the plate down the posts. See figure 9.35



Figure 9.35- use channel locks or vice-grips to crimp down the link.

•Clip Link, using the mini-press. MUCH easier with this tool. Simply follow the directions provided with the tool. Below is a brief walk-through with special pictures and diagrams.



Figure SPECIAL 1.1- press the side plates together with the chain press elongated plates. Be sure to not allow the END of the LINKS to be impacted by the press.



Figure Special 1.2- install the clip link as shown with pliers.



Figure SPECIAL 1.3- installed clip link.

- Install the outer clip ring with the **ROUNDED** edge (not the pronged edge) facing the direction of travel. See figure Special 1.3

Step Ten- Final assembly

- Place a bar between the rear wheel and swingarm, as described in step 3. See Figure 3.2 and 3.25
- Using a 32mm socket- torque the front sprocket to the OEM required specifications. See figure 10.1 and 10.2



Figure 10.1- sprocket installed



Figure 10.2- torqued to spec and retaining soft-metal ring bent over to assure sprocket will not back out

- Replace all bodywork, fairings, chain guards (if possible) sprocket covers and bodywork components. Installation is now complete.
- Remove the bar between the rear wheel and swingarm.
- Make sure chain alignment markers on the swingarm indicate the wheel is straight.
- Using your hands **NOT THE MOTOR**- spin the rear wheel to make sure that it spins freely, while applying chain lube to the chain.

- Using simple green on a rag- clean up the excess chain lube on the tires and wheels that may have been accidentally dropped on them during installation.
- Check all bolts, nuts and washers.

Step Eleven-Final adjustments, Test Ride

- Remove the bike from the rear stand.
- Perform all normal pre-ride checks!
- PUT A HELMET ON!
- When first starting, DO NOT HAMMER the throttle. The chain needs time to warm up and slightly stretch into the grooves of the sprockets. If you get ham fisted on the first ride you will likely cut the life of the chain by 50%. Don't exceed 5,000 RPMS (3500 on V-twins) for at least 10 miles. You need to pay attention to noises and vibrations and call us if you hear anything strange. Some high-pitched whining can be expected at first.
- Allow the chain and sprockets to cool completely, reapply chain lube after 30 minutes of letting the bike rest.
- On the second ride- you can get on the gas BUT BE CAREFUL. Many things have changed on your bike and it's important to get used to it again. Your bike will likely accelerate MUCH faster and become quite a bit more responsive to very minor throttle inputs. It's like putting Nitrous on your grandmother's Lincoln. If you don't know what to expect, you'll end up on the curb. So take it easy and allow yourself and your bike to acclimate slowly to the new modification! There will be a lot of factory chain lube on the wheels, tires and all surrounding areas.

Maintenance, adjustments and replacement intervals

- Always check the bike while on the rear stand.
- Your chain and sprocket set is designed for maximum performance, and accordingly you will replace components slightly more frequently than the OEM steel stuff.
- Chains normally last about 15,000 miles.
- Front sprockets will normally last about 15,000 miles.
- Rear sprockets will normally last about 7500 miles.
- However- you should replace ANY worn component regardless of miles.
- Always lube your chain at 500 mile intervals. It is no big deal to see a chain and sprocket set with 10,000 miles if it's been lubricated. Some VFRs get 20,000 miles!
- All RK premium chains (the only kind we sell) are warranted to a pro-rated 20,000 miles
- Use a quality chain lube- do your own research on these. We suggest Maxima or Chain Wax.
- The chain WILL stretch about 2% the first 10 miles – then another 1% the next 100. After that, only normal tightening-as-necessary is needed. You should always have 1 ½" to 2" of slack on your chain.
- Enjoy! The Chains and sprockets we sell are the highest quality around and are designed for maximum punishment and enjoyment. Take care of your stuff and it will bring your miles of smiles!

NEED MORE INFORMATION?

- Visit our website at www.sumofallparts.net
- Call us at 512-416-1800
- Email us at customerservice@sumofallparts.net
- Come by the shop!