



**Bicycle-Engines.com**

The Bicycle Engine Conversion Specialists

# 4-Stroke Engine Kit Installation Manual



**READ THIS MANUAL THOROUGHLY  
BEFORE ATTEMPTING TO INSTALL  
OR USE THIS PRODUCT**

## **LEGAL NOTICE:**

Laws vary from state to state and city to city. For complete legal details contact your local state and/or city authorities. The end-user or installer becomes the vehicle manufacturer and assumes all legal liability. When riding always wear a helmet and abide by local and state laws. You are the designer and manufacturer of your motorized bike. If at any time the structural integrity of the bicycle is questioned, consult a professional. Use proper engineering practice and common sense when making your component selection. It is critical to pay attention to the structural integrity of the frame and chassis.

### ***Do not ride with inadequate brakes!***

Extra care is required to ensure all components of hubs, rims, brakes are adequate.

Do not use a bike with wheel fenders as they can come loose and get jammed in the spokes while riding causing rider injury. When in doubt, consult a professional mechanic. Speeds in excess of 25 mph are highly discouraged due to a bicycle's lightweight design and stability limitations.

### ***Mechanical aptitude is required.***

Do not attempt this project if you do not have a basic understanding of engines, tools, bicycle mechanics and knowledge of mechanical devices. Proper cleaning of components and blue thread-lock are recommended on all metal to metal fasteners.

**\*\*\*ENGINE SHIPPED WITHOUT OIL\*\*\***

## Step 1: Select a proper donor bike:

Donor bikes with 28 mm to 38 mm diameter front down tubes and 28 mm diameter seat tubes are recommended due to the smaller outer diameter of frame tubing. If a frame with larger tubing is used, the motor mount and gas tank mount may need to be modified.

Cruiser type bikes with 26" rims and heavy steel frames work great as well as heavy-duty steel V-frame mountain bikes. Be sure to pick out a strong frame. Frames utilizing 29 inch rims may need special attention to the rear sprocket mounting due to the increase in spoke count. Unconventional tire sizes larger than 29" or abnormally wide tires may be incompatible or require other modifications.



CRUISER FRAME



V-FRAME MOUNTAIN BIKE

Your 4G Kit includes a Wide Pedal Crank with 1-to-3-piece wide crank conversion kit that allows installation into both a large 52mm diameter bottom bracket holes made for a one piece crank or small diameter bottom bracket holes for 3 piece pedal cranks. It is essential that your donor bike has both front and rear brakes for safe operation. Cantilever or "V" pull brakes are strongly recommended. Coaster brakes are not adequate and not recommended.

The motor with the mounting plate is about 11" tall and the mounting plate sits about 3" above the bottom bracket. You will need at least 14" of clearance between the bottom bracket and bottom of the top tube to mount the engine within the frame. You may have to remove the chain guard to get clearance. You can make a 4-stroke template to size your frame for adequate space: cut a piece of cardboard 9 1/2 inches tall and 8 inches wide making sure you don't round any corners. If the square fits inside the "V" of the frame, a four-stroke engine kit should fit.



## Step 2: Install wide cranks:

If you have problems installing 3-piece wide crank kit, please consult your local bicycle shop. Bicycle bottom brackets vary from bike to bike.



### For bikes with 3 piece cranks:

If your bike came with 3-piece cranks and multiple front gears, the standard crank spindle, arms, and sprockets must be replaced with the 3-piece wide crank spindle, arms, and sprocket. You will NOT need to use the 1 to 3 piece conversion. You may keep the rear dérailleur and cassette.

1. Install the wide crank spindle in reverse order after removing your standard cranks.
2. Install the single sprocket with the included sprocket bolt.
3. Install the left and right crank arms and pedals.  
Be sure to use thread-lock on the bolt holding the sprocket on to the bottom bracket as well as the crank arm nuts. Use 9/16 thread pedals found on most mountain and road bikes.

### For bikes with 1 piece cranks:

1. If your bike came with a 1 piece crank then you must use the 1 to 3 piece crank conversion included with your kit. Remove your 1 piece crank assembly and install the black shell reducers from the 1 to 3 piece conversion. Make sure that the right-hand thread shell reducer (has 3 holes the bolts SLIDE through) is on the right and the left-hand thread shell reducer (has 3 holes the bolts THREAD into) is on the left. This is to ensure that the unit stays tight when pedaling. Check that shell reducers are fully seated into the bottom bracket. Install the three bolts with thread-lock.
2. Clean threads with a degreaser or parts cleaner. Install the left side bearing cup (has large flange on outside and left-hand threads) into the left side shell reducer. Make sure to fully tighten and use thread-lock.
3. Grease and place the bearings on to the 3pc. wide crank, making sure that the cage is facing inward and the balls are facing out. Install the assembly from the right side of the bike with the right side bearing cup.
4. Adjust bearing tension and install locking ring. Use thread-lock on locking ring.  
Install the single sprocket with the included sprocket bolt. Install the left and right crank arms and pedals.  
Be sure to use thread-lock on the bolt holding the sprocket on to the bottom bracket as well as the crank arm nuts. Use 9/16 thread pedals found on most mountain and road bikes.

### 1 to 3 Piece Conversion Kit



### 3 Piece Wide Crank Kit



### **Step 3: Install transmission on motor and mount engine:**

1. Mount the transmission on to the motor using the supplied hex bolts.
2. Remove 8 side bolts from the engine mounting bracket and separate the plate from the 2 end slide mounts. Attach the end slide mounts to the bike frame. If the frame down tube is too big for the slide mount opening, grind out the curvature and you may need to remove, drill and tap to re-position the studs outward.

***NOTE: Engine must set level for best carburetor operation and engine oiling.***

3. Install the engine on to the engine mount plate using the supplied bolts. Keep the bolts loose so that the engine can slide in the mount. The mounting bracket has offset holes and the best fit is usually with the offset to the left side of the bike. Place the engine mounted on bracket plate into the bike on the 2 castings.
4. Remove the master link from the engine drive chain with needle-nose pliers. Put the master link in a bag or other container immediately as it is easily lost. Drape the chain over the rear sprocket and transmission output sprocket. Pull the chain taut. Check the chain alignment of from the transmission to rear of the bike, the chain should be in alignment with both sprockets. Either mock mount the rear sprocket or go to step 5 (pg. 5) and mount it.

You can adjust the alignment by sliding the engine left or right on the engine plate. If you cannot get the chain aligned properly, you may have to remove the wheel drive sprocket and change its orientation (from concave-in to concave-out.) Once you are satisfied with the engine drive chain alignment apply thread-lock to all bolts and tighten. If the holes don't line up, you can clamp the engine plate to the slide mounts with vise-grips while you install the side bolts. Be very cautious when tightening the side bolts. They will strip the threads in the castings if you over tighten them (over tightening is not covered under warranty).

At this time, you can install any special muffler you intend to use. The engine comes with a manufacturer supplied muffler installed, but consider a one-piece muffler (part number 4S-ES-STDMUFF) or two-piece (part number 4S-ES-PPD) muffler for enhanced looks, sound, and performance.

#### ***Optional Mufflers:***

***1 Piece Standard Muffler***



***2 Piece Deluxe Muffler***



#### Step 4: Install the rear sprocket and chain

1. Disassemble the sprocket mounting assembly included with the kit. Apply a light coat of grease or anti-seize compound on fasteners. This will keep water and salt out of the threads and allow for easier removal of the sprocket mounting assembly in the future.
2. Hold the rear sprocket with the concave side facing you and push the bolts through the holes. On the convex side, fit the set of three banana mounting plates on the bolts. Then, fit a rubber gasket on the bolts
3. Place the sprocket assembly on the wheel making sure that the rubber is against the outside of the spokes. In order for the inside rubber gasket to go around the axle cut one side between the holes. Reach inside the spokes and fit the inside rubber gasket on the bolts against the spokes.
4. Install the 2 half-moon plates on top over the inside rubber gasket. Install lock washers and nuts.
5. Make sure the sprocket is centered on the axle. Once the sprocket is centered, tighten all bolts in a “star” pattern. Tighten the 9 bolts until the gap between the rubber gaskets closes completely.
6. Prop up the bike so the rear wheel is free to spin. First, make sure the sprocket is concentric by measuring from teeth to the center of the axle hub. Loosen bolts and re-align if needed. To true the sprocket use a ruler to detect wobble. Place the ruler or straight edge on the chain stay bar and push it towards the sprocket until it almost touches. Spin the wheel while looking at the edge of the sprocket. Loosen and re-tighten sprocket bolts in sequence to eliminate wobble. Take your time and make sure your alignment is good. It is important that the sprocket is installed correctly or the chain will jump off.

#### Chain Length and Installation:

The chain you receive is longer than necessary in order to accommodate most bikes. You may need to remove the appropriate number of links to fit your build. To estimate length required place the chain around both the drive sprocket and the wheel sprocket, gripping in one hand while pulling chain taut with your other hand. Mark the chain location to make the master link splice. It is recommended to go one to two links extra in length as the chain should be loose enough to slip off the rear sprocket. You will want to be able to remove the chain later without having to remove the rear wheel. The chain tensioner will take up any slack. The chain will not slip off on its own, assuming everything is aligned properly. Keep in mind that the chain will be one link longer when the master link is re-installed.

Once you have decided on a chain length, mark the link to be removed. A “chain breaker” tool is recommended. Install the master link on the chain. Push the master link (with pins) into the chain from the left side of the bike. Install the chain tensioner. Make sure that the chain tensioner wheel rides on the outside of the chain as shown in the photo. The chain should move about ½” up and down from a point midway between the seat tube and rear wheel. It should not bind excessively when the rear wheel is turned. If it binds, check the chain tension and sprocket alignment. Do not start the engine until you can rotate the wheel by hand without the chain binding or slipping off. A binding chain under full load can break sprocket teeth or cause other damage!

There is not a chain guard included with this kit. The end-user can fabricate a sheet metal guard as required for his own form, fit, and function. One option is to use a 2 cycle engine chain guard and modifying it as required. Make sure that when you are riding, you don't have any long clothing or other belongings or body parts that could get caught in the chain.

#### Additional Rear Sprockets

*(a 48 Tooth sprocket is included with each kit)*

**Change the gearing on your motorized bike to optimize performance.**

**Use a smaller rear sprocket for higher speeds or use a larger rear sprocket for more torque for hill climbing.**



## **Step 5: Install the Gas Tank, Throttle, and Kill Switch**

Install the tank on the top tube of the bicycle and hook up the gas line to the carburetor - connect fuel line to bronze colored tube on carburetor. Use a strip of rubber from an old tire tube to cushion tank on the top tube. Even though the tank in our installation kit has zinc plating inside to help prevent rust it is a good idea to have your tank "KREEM" ed before installation to prevent possible rusting during times of long-term non-usage such as storage during winter. This product is available from motorcycle dealers by the trade name of "KREEM" and is made in Somis, CA.

Note: the factory supplied clear plastic fuel line will get hard over a period of time.

***\*NOTE: A Gas Filter is in the tank petcock valve.***

***If the engine runs poorly clean the valve filter as residue from the tank may have clogged it.***

### **Throttle and Kill Switch Installation:**

- Get the appropriate throttle position by sliding the throttle all the way until the grip bottoms out then back off about 1/8"
- Drill hole in handlebars for locator peg inside throttle to mount handlebars in this location.
- Slide the throttle assembly on to the right side handlebar and match up the peg with drilled hole.
- The throttle kill switch has 2 wires that are connected to the two wires coming out near the of the pull start cover. Remove the plug from the two wires coming from the motor and connect one from the motor to one from the kill switch and the other from the motor to the other wire from the kill switch. It makes no difference which wire goes where as throttle mounted kill button is a normally open single switch. Test the kill switch with a multimeter to be certain of functionality.
- Test the throttle for smooth operation.

### **Throttle Cable and Choke Hook Up:**

Hook up the throttle cable to the throttle arm on the carburetor as shown. Ensure that the throttle arm returns to the idle position after you let go of the throttle grip. The idle position is when the throttle arm touches the black plastic idle screw. Some engines differ in this area so field modification may be required on the part of the installing mechanic.

- Check engine oil level in crankcase; **NEW ENGINES HAVE NO OIL!**
- This 4 cycle engine requires frequent crankcase oil changes to ensure long engine life.
- Be sure to read the engine specific owner's manual. Use 20 or 30wt. oil to full line on the dip stick.
- Change the oil after break-in.
- Change the engine oil every 25 hours under normal loads and every 15 hours under heavy loads.

***REMEMBER: This is not a car engine that can go 5000 miles between oil changes.***

1. Make sure the engine is not running and on level ground.
2. Remove the oil filler cap/dipstick and wipe it clean.
3. Without screwing it in, insert the dipstick into the filler neck.
4. Check the oil level shown on the dipstick.
5. If low, fill until the oil is in the middle of the dipstick without screwing it in.

## **READ COMPLETE OPERATION GUIDE BELOW THEN MOVE TO ENGINE BREAK-IN.**

### **Operation:**

Check chain idler and chain for smooth operation and alignment. First visually check, then pedal bicycle around with engine off to verify proper operation of all critical components including but not limited to bearings, brakes, wheels, tires, spokes, handlebar, cables, seat, and axles. The entire bike should be looked over.

Make sure that the newly installed cables do not bind or pinch at full lock and full handlebar movement is available.

Ensure that the fuel valve lever is in the "on" position (parallel with the fuel line).

Check the fuel line to make sure gas is getting to the carburetor. Before you start the engine, test the brakes.

Set choke to ON position, Pull starter rope on the engine; Allow for warm up time and release choke lever.

Before riding, make sure that when turning handlebars, cables are not pulled causing the engine to rev. If this is the case, re-route cable as necessary and re-test.

It is best to pedal your bike until moving and then give the engine progressive throttle advance. To reduce stress on the clutch, it is recommended to pedal up to 5-10mph before engaging the motor.

Twist the throttle handle progressively. As engine rpm increases the centrifugal clutch will engage. If it feels like the engine is "over revving", you have reached the maximum speed allowed by the sprocket gearing.

Coasting will allow you to travel smoothly down a hill. To stop, shut off the throttle and apply brakes. To kill engine; push kill switch button on throttle handle.

***Disclaimer Note: Please remember this is only a PARTS KIT made for a Huasheng or Honda engine: Failure to understand or carry out installation instructions is not the responsibility of manufacturer or the selling distributor.***

Engine knowledge and mechanical aptitude are required. Modifications to install may be necessary on the part of the end user. Operating a motorized bicycle involves some risk of bodily injury. Buyer accepts full responsibility for any and all vehicle operations that may lead to personal injury, economic loss, social distress, other losses, costs and damages.

Neither China GAS, / Grubee inc. nor the selling WD Distributor can be held responsible for injuries and / or damages resulting from operating a motorized bicycle with this engine installation kit.

This kit is not recommended for use by persons under 16 years of age. Obey all traffic regulations. Always wear a helmet while riding. Remember that you are riding a motorized bicycle and other traffic may not be able to see you.

Never operate your motorized bicycle on a pedestrian thruway or sidewalk while the engine is running.

Never operate your motorized bicycle in an unsafe manner. Check local and state laws before riding on streets.

Mechanical aptitude is required: please do not attempt this project if you do not have a basic understanding of engines, tools, and knowledge of mechanical mechanisms.

### **Engine Break In:**

***\*\*PRACTICE RIDING BICYCLE WITH ENGINE OFF AND READ MANUAL COMPLETELY BEFORE ATTEMPTING.  
TEST BRAKES AND CHECK OTHER CRITICAL COMPONENTS BEFORE MOVING FORWARD\*\****

1. Start the engine, let it warm up to operating temperature, varying the throttle from 0-1/4. Once the engine is up to operating temperature, kill the engine and let it cool completely.
2. Start the engine and let it warm up to operating temperature varying the throttle from 0-1/4. Once the engine is up to operating temperature ride the bike for less than 5 minutes, never going above 1/2 throttle. Kill the engine and let it cool completely.
3. Start the engine and let it warm up to operating temperature. Once the engine is up to operating temperature ride the bike for 10 minutes, never going above 1/2 throttle. Kill the engine and let it cool completely.
4. Start the engine and let it warm up to operating temperature. Once the engine is up to operating temperature ride the bike for 10 minutes, never going above 3/4 throttle. Kill the engine and let it cool completely. Your engine is now broken in!
5. It is recommended to change the oil following the break in period to flush the engine of any small manufacturing debris and any material from the break-in process.

***DO NOT REV THE ENGINE ABOVE 7500 RPM.***

***DO NOT SUSTAIN RPM ABOVE 7000 FOR LONGER THAN 5 SECONDS.  
DOING SO WILL CAUSE SEVERE ENGINE DAMAGE THAT IS NOT COVERED UNDER WARRANTY.***

## **6 Month Warranty:**

All motorized bicycle engine kits and bicycle engine parts come with a 30-day manufacturer warranty and a limited 6 month extended warranty from the date of purchase. Warranty does not cover: damage due to improper installation, misuse, over-revving engine, overheating engine, maintenance neglect, normal wear and tear, damage resulting from the addition of parts or accessories not included with the original motorized bicycle kit, damage caused by neglect, misuse, or abuse including, but not limited to accidents, stunts, races, or other extreme riding, damage resulting from vandalism, theft, fire, or other acts of God, damage resulting from unauthorized attempts to repair other damages, damage or failure of disposable or consumable parts including but not limited to: spark plugs, fuel and air filters, chains, cables, hoses, gaskets, grips, wiring or wire connectors, brake or clutch pads, lubricants and oils, cosmetic scratches, dents, cracks, blemishes, or discoloration. Warranty does not cover any labor charges. All warranty claims will be inspected and approved at the discretion of our employees.

***Any purchase containing a gas engine or kit which includes an engine has a strict NO RETURN POLICY.***

No refunds or exchanges will be made for these products unless they are defective. Should you have a defective part, we will ship out free spare parts after we receive proof of your defective part. Due to the nature of these products we are unable to accept any "like new" returns.

## **Maintenance Guide:**

This maintenance guide pertains to your four-stroke engine and transmission only. It does not contain information on general bicycle maintenance. For routine bicycle maintenance, please see your bicycle manual or visit your local bicycle shop. Note that with the installation of a motorized bicycle engine, regular bicycle maintenance and inspections must be performed much more often as a safety concern. The increased speed and weight of a motorized bicycle can greatly increase wear on bearings, brakes, and critical frame components.

Periodic Inspection and adjustment of your engine, chain, cables, brakes, etc. are essential to maintaining a high level of performance with your motor.

### **Engine Oil:**

The manufacturer of the Hua Sheng F142 49cc 4-Stroke engine recommends a high detergent, premium quality motor oil certified to meet or exceed U.S. automobile manufacturer's requirement for service classification SG. SF. SAE-30 is recommended for general, all temperature use.

Running the engine with insufficient oil can cause serious engine damage.

Be sure to check the engine on a level surface with the engine stopped.

### **Chain:**

Lubricate chain with a high-quality motorcycle or bicycle oil. Make sure if using motorcycle chain oil to use non-oring chain lube. Bicycle chain oil will have to be installed more frequently and offers less protection, but has reduced drag. Motorcycle chain lubricant offers more protection and less maintenance at the cost of increased drag.

### **Air Filter:**

Clean air filter every 10 hours of ride time. This can vary greatly depending on the surface that the bike is being used. Dusty conditions require more frequent maintenance.

### **Valve adjustment:**

Check valve adjustment after first 10 hours of use and every four oil changes thereafter. If you are not a mechanic or have any prior valve adjustment knowledge, please bring the motor to a small engine repair shop for the valve adjustment.

Valve Clearance

- Intake .08 mm (0.003 inches) +/- .02mm / Exhaust .11 mm (0.004 inches) +/- .02mm

### **Storage:**

Drain gas from the tank and the carb. Remove float bowl and make sure all fuel is drained. Reinstall float bowl.

Failure to do so will result in fuel gumming up in the carburetor (especially the smaller jets), resulting in having to perform a complete carburetor clean or a new carburetor when using the engine. This can happen in less than 2 months of storage.

## **Thank You and Congratulations!**

You have just purchased an outstanding engine and transmission parts kit. If you're wondering why we have so many options it is because all markets are different and personal opinions differ. The end user or installer must decide to suit his own needs. Mechanical aptitude and hand tools are required. Be sure to apply *LocTite 242* thread lock to all fasteners and check final torque to ensure all are tight and secure. It is best to have a qualified automotive or motorcycle mechanic do the installation if you lack the necessary experience or aptitude. Please use caution when operating a motorized piece of equipment and follow all federal, state and local laws.