

PLEASE READ THESE INSTRUCTIONS BEFORE INSTALLATION

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GT2A > 48cc / 40mm x 38mm bore and stroke: Center Fire Sq. Head.

GT2B > 48cc / 40mm x 38mm bore and stroke: Angle Fire Rd. Head.

GT5 > 66cc / 47mm x 38mm bore and stroke: Angle Fire Sq. Head;

New; GT2-SM SuperMouse > 48cc: Internal CDI & 203 crank brgs. Angle Fire Sq. Head;

New: GT5-SR SuperRat > 66cc / Internal CDI & 203 crank brgs. Angle Fire Sq. Head;

Kit Box Contents:

2 cycle gas engine with dual needle bearing: Black Catalytic exhaust muffler; Tear Drop 2.5L Fuel Tank plated inside; Bicycle 1/2" x 1/8" drive chain; Chain guard; 44 tooth Sprocket with 9 hole mounting hardware for 36 spoke wheel; Ball bearing chain idler: Push button clutch lever, CNS premium EPA approved carburetor with external choke control: New design CD Ignition, Twist throttle with integral kill switch: Tool kit with Extra spark plug; Extra mt. block, Extra head gasket:

To ensure engine performance: DO NOT use other than original SkyHawk replacement parts.

Note: Failing to follow these instructions when installing a certified engine in a piece of non-road equipment violates Federal Law 40CFR-1068.05 (b) and is subject to fines or other penalties as described in the Clean Air Act of 1970. Mechanical aptitude and ability is required to perform this installation. Many "do it yourself" backyard mechanics will find this project rewarding. A love of small engines is the only required catalyst for this project. However, installation is sometimes best done by a professional auto or motorcycle mechanic. Frame size should be 28mm to 30mm dia. with 70 degree included V angle. For sufficient engine clearance select a bike with a seat tube length of at least 12 1/2 inches measured between bottom of top tube and top of pedal sprocket tube. A rewarding joy and challenge is found in designing a custom installation of your own. Remember, a quality installation is paramount to safe usage and long term satisfaction. You may find many uses for this engine kit from stationary machine power to off road riding machines. Have fun and good luck on your motorized project.

STEP #1 Mounting the Engine:

1. The engine mounts in a “Vee” frame. It is best to make sure all 4 engine studs are securely bottomed out in the engine before mounting. Use a Jam nut procedure to tighten.
2. Consider using Masking or Duct Tape on the front down-tube & seat tube of your bicycle to protect the paint finish while test fitting the engine to your donor bike. If the distance between the two frame tubes exceeds the engine mounting span then additional spacers or welded brackets may be required. Mount the engine to the seat tube first and then fit to the front tube. If frame tube fit is smaller than engine clamp dia. use strip shims to fit. See figure one for example of installation on a wide frame bike..

Special FrontMounting

When installing engine in a odd size frame it may be necessary to modify the existing front mount. This is due to some oversized down tube frames being longer or wider then the motor is designed to fit.. If you find that the front engine mount will not reach the down tube when the motor is mounted to rear tube you will need to make modifications. You can use the extra mt. block found in the tool kit to space the engine forward by cutting it to fit and installed it at the rear. Another idea is shown in the diagram at the right)

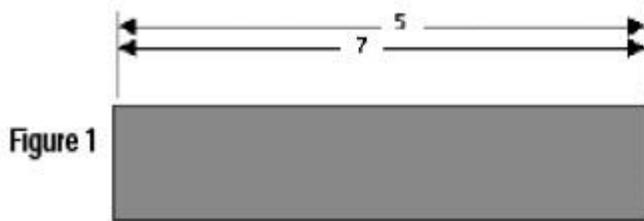
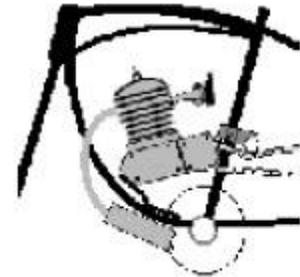


Figure 1. You will need a 3/16" X 1" flat steel bar 5 to 7 inches long. To determine the length you will need attach the motor to the rear (seat post) down tube. Measure underneath the motor on the frame to makes sure there will be enough room to mount the bar on the motor and meet the front mount of the engine. The length will also depend on the distance from the frame to the motor.

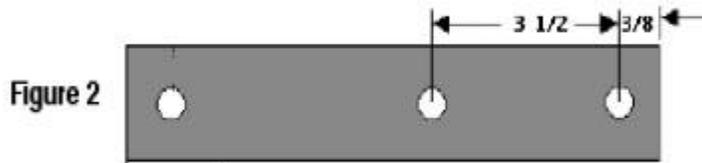


Figure 2. Drill three holes in the flat bar. They will need to accept 6mm bolts or 1/4 US thread depending on your choice of bolt. For the left hole use the furnished large down tube adapter to determine placement of the hole. The measurements for the two right wholes are an estimate and may vary with individual installations.

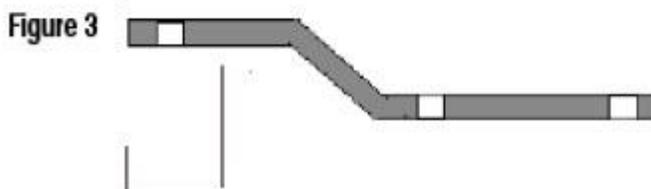


Figure 3. Bend the bar as shown in figure 3. The front, or left side must be bent up high enough to connect to the mounting holes on the front of the engine. It is important that the two bar ends are parallel to the frame not to each other.

Figure 4. Align the furnished large tube adapter to the bar and mount to the bottom of the bar. The bar will run through the space for the frame on the motor and the mounting holes will rest on the adapter.

Figure 5. Mark where the mount will rest on the frame, be sure to line the mount up with the frame so it is centered and straight.. Remove the motor from the frame. Drill two holes through the frame using the finished mount as a guide. Bolt the mount to the frame. On the bottom of the frame use half moon caliper brake mounting washers. Tighten the bolts securely but do not over tighten or damage to the frame may occur . Use Lock-tite or similar product on the bolts and butts along with lock washers.

MOUNT ENGINE IN FRAME as low as possible: AVOID BEING TOO HIGH UP IN THE FRAME.



If engine is mounted at a high angle position the chain will hit the sprocket cover. Keep as low as possible.



Remove front and rear fenders for safe operation: End user assumes all product liability as prime contractor:
 Note: Quality Beach Cruiser bikes work good as well as do the classic 70 degree old time European style.

Note: Front mount size is different with new 203 brg. block engines versus old style 202 block engines.
(202 bearing blocks have ft. mount dia. of 30mm and the new 203 bearing block engines have 40mm.)





Figure 1.

Bike with wide frame or big down tube: Use $\frac{1}{4}$ " thick 1-1/8" x 2-1/2" steel plate with one hole in the center for a bolt to go through a drilled hole in tube frame and two holes for cap screws to go into engine block. Additional spacers maybe required depending on the donor bike.

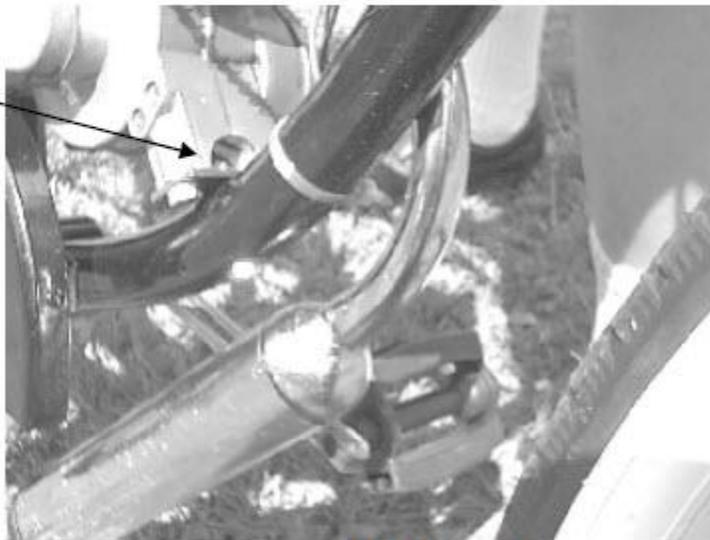


Figure # 1

3. If the rear frame tube from the seat down to the pedal sprocket is too small to fit the rear engine mount, a rubber shim can be made from an old bicycle rubber inner tube. This also helps reduce engine vibration. Engine needs to have the carburetor set in a level position. **Too much engine tilt can cause chain to hit the drive cover and engine to not run correctly. It is best to have the drive chain to rear wheel sprocket be as horizontal as possible with no more than 15 degrees max engine tilt.** After the desired engine location is determined mount the engine to frame. Applying LocTite thread lock is recommended to avoid loosening due to vibration. **Note: All threads are metric.**

ChainWheel Sprocket Installation:

The Drive Chain Sprocket has a 36.9 mm dia. center hole and mounts on axel hub on the left side of the rear wheel against the spokes dish side in. The sprocket must fit over the hub in a perpendicular plane with the axle. This insures that your rear chain sprocket spins true with the rear bike wheel. ***NOTE:** On some older bike axle hubs like on coaster brake models it may be required to slightly enlarge the sprocket center hole to obtain a flush, and concentric fit next to the spokes. This is best done on a engine lathe by a professional machinist.. . It is also recommended that the rear wheel be re-spoked to 12 ga. spoke wires to insure long life. Most any Bike shop can do this operation for you. Applying thread adhesive and equal tightening of the sprocket bolts. This keeps the chain sprocket true with axle and free from wobble while spinning. With bike upside down spin wheel and check sprocket for wobble. The chain can jump off the sprocket if the sprocket installation is done incorrectly

1. For kit sprocket installation, locate sprocket on axel hub with curved side next to spokes, shiny side in. If not pre sliced, cut the rubber isolator ring between holes in order to fit INSIDE the spokes and around the axle. Install the split steel retainer plates next to the rubber isolator and insert 9 bolts.
2. Secure with 9 bolts compressing the chain sprocket to the spokes. Note: Rubber isolators may be needed on both sides of sprocket for chain alignment.
3. The **Chain Sprocket on the Wheel** must align within 1/2 cm to the **Chain Sprocket on the Engine**.
4. The wheel chain sprocket is mounted with teeth-out and dish-in next to spokes. **SEE FIG. #2**

Place Sprocket's bright chrome side inward next to spokes with dished side outward:

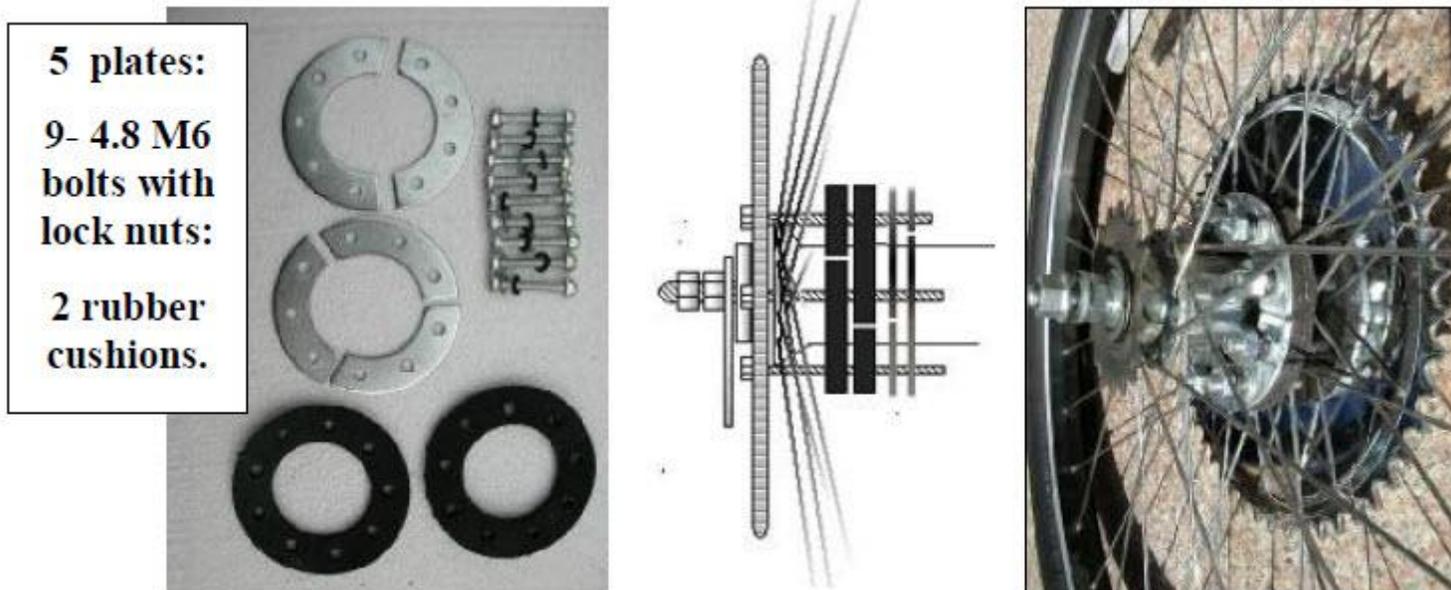


Figure #2 - 9 slot - ChainWheel Sprocket mounted concave dish side inward:

Options available from your dealer:



The drive chain can be easily shortened to the correct length. Special tools are required to remove and replace the master link when shortening the chain by removing links. Ideally, both your **pedal drive chain** and your **engine drive chain** should have the same ension.

A. Remove left rear cover plate from engine. This is the plate next to and under the clutch swing arm.



B. MASTER LINK

B Your engine may come with a standard bike chain or with a Heavy Duty 415 chain depending on how it was ordered by your dealer. Engine drive sprockets are different depending on chain size. The 415 chain uses a wide drive sprocket and the std. bike chain uses a narrow one. A 415 chain will work with a narrow sprocket but a std. bike chain will not go over a wide drive sprocket. Note: Install chain with master link clip on outboard side of the primary drive sprocket teeth. (Note: wide tires larger than 2.125

may rub on a wide 415HD chain:)

C. Use supplied spark-plug wrench to turn engine crankshaft sprocket to feed chain around it. Do not pry sprocket with a screwdriver or similar object.

D. Fit chain, measure and remove excess links to assure proper length. Be sure master link connection rides on the inboard side of the primary drive sprocket or interference of link and sprocket can occur. Proper chain length is when top chain has $\frac{1}{4}$ inch to $\frac{1}{2}$ " deflection with the bottom side of the chain loop tight.

E. Chain tension adjustments can be made by pulling rear wheel back if frame has straight slot wheel drop out. If both chains can be adjusted equally then installing chain idler on the wheel strut may not be necessary. At installer's discretion the chain idler can be installed on either the pedal chain or engine drive chain.

F. Install supplied chain safety guard by attaching to engine and wheel axle struts.

Ignition Coil and Engine Kill Switch installation

- A) Mount CD ignition coil on bike frame, close enough to attach coil wire to spark plug. Mount as far away from exhaust pipe as possible to avoid heat damage to semiconductors in CDI module.
- B) Attach CD ignition coil wires to same identical color coded wires coming from engine.
- C) Install Engine Kill Switch Wire on throttle to white wire coming from engine. Install the other wire with eyelet to a good frame ground not on paint. This will ground ignition and stop the engine when the kill button switch is activated.
- D) Route all wires away from engine exhaust heat. Secure wires with a plastic tie straps.

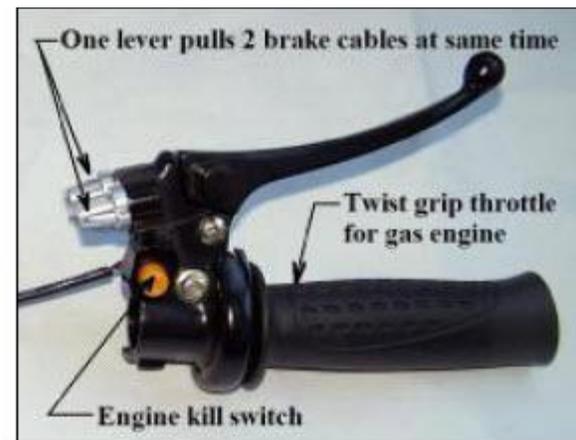
***!WARNING!** Operation of engine without stop or kill switch installed could result in personal injury if an emergency stop is required! The only alternate non recommended way of killing the engine is by releasing the clutch lever with bike brakes on and engine at slowest idle.



Std. Push button Clutch lever:



Opt. Dual lever Clutch & Brake:



Opt. Dual brake cable throttle:

Clutch cable installation and adjustment:

- A) Install clutch lever to left side of handlebar and attach cable end barrel into lever slot hole.

- B) Squirt oil down the cable sleeve: Route clutch cable through the ball-mount on motor with the big spring around the cable acket and ahead of the ball mount. The big spring serves as a cable heat shield.
- C) Insert cable wire through small spring and route through clutch arm and attach brass cable-end and screw. Adjust cable tension to allow very slight play in arm. Handlebar clutch lever must be in the released or outward position to complete this operation.
- D) Activate lever a few times, and check clutch arm for slight free play: **About 1/16" engine clutch arm free play is required with the handle bar lever in the released in what is called clutch engaged position or the engine will fail to start if cable is too tight. Re-adjust as required.**
- E) **Basics of clutch operation:** The handlebar lever pulls the cable that moves the engine clutch arm. In turn the clutch arm pushes a rod through the motor that pushes the clutch plate out. (similar to a car clutch.) Releasing the handle bar lever engages the clutch and provides engine torque to the drive chain or to start the engine. The clutch friction allows engine to start, and also transmits engine torque to the drive chain. When the bike is in the pedal mode the handle bar clutch lever is locked inward in the catch notch. The bike then operates in default as it would without any engine. Periodic clutch adjustment is necessary to maintain efficient operation ***NOTE:** Cut off excess cable from clutch arm, before operation, to avoid possible interference with pedals, chain, or your legs, etc. **See Figure #4.**

Clutch arm:
1/16" free play:

Clutch cable Note brass screw lock at the end:

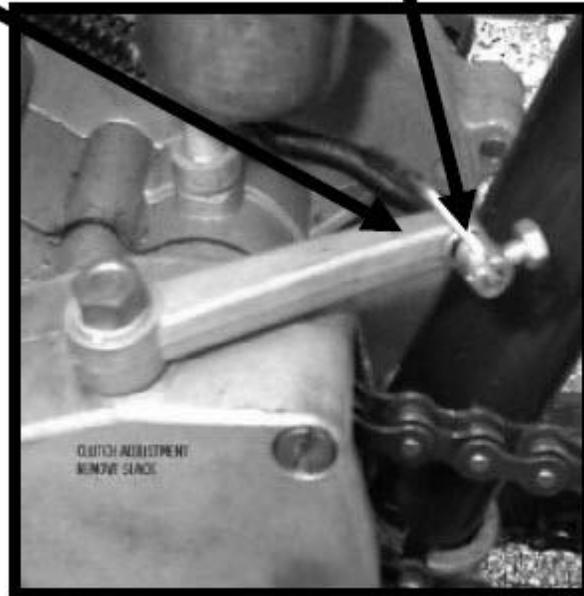


Figure #4 Additional cable adjustment can be made at mid cable joint.

NOTE: If Clutch cable is not adjusted correctly the engine will not start. Check for 1/16 " clutch cable arm free play with handle bar lever released.

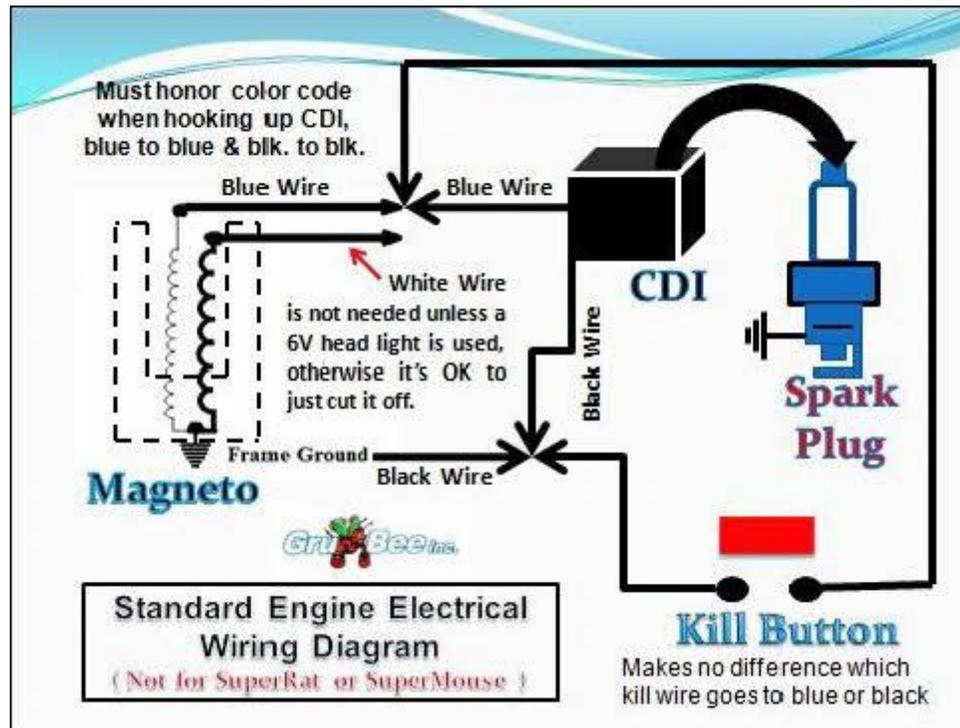
Carburetor and Throttle Installation:



THROTTLE with kill switch:
See Wiring Diagram below for the switch wire hook ups.



Drill small hole in handle bar for pin lock.



GT2B, GT5 and GT2A models with external CDI use this kill switch hook up

Magneto Operation;



The magneto winding consists of 2 coils, a top coil and a bottom coil wound on the same plastic bobbin.

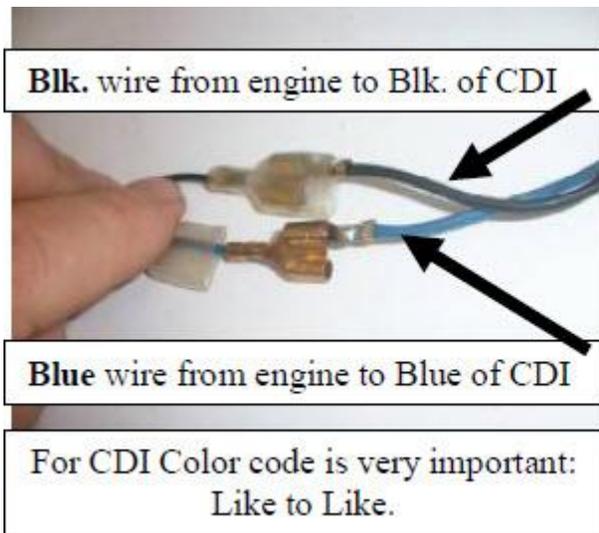
1. The **Top coil** is wound with approx. 4000 turns of ultrafine copper wire and is used to fire the CDI module. One coil end is grounded and the other end is connected to a BLUE color lead wire going to the CDI.
2. The **Bottom coil** is wound with approx. 400 turns of heavier wire and was intended to be used for a 6V Head Light. One coil end is grounded and the other end is connected to a WHITE color lead wire.
3. The White wire is not normally used except for maybe attaching to the Kill switch or for a 6V head light. If used for a headlight it will rob engine power and does not supply sufficient voltage at engine idle to burn a normal head light. However, with the new 6V LED lights on the market it may work a lot better now?
4. As the 2 pole rotor magnet that is attached to the end of the crankshaft turns a North/South magnetic flux cuts the 2 magneto coils thus inducing a voltage impulse going to the Blue and White wires and returning back via the frame ground.
5. Both coils are connected to a common frame grd. at the solder joint on top of the steel segment U frame. This is the point where most failures happen when corrosion eats through the **Top coil** fine wire. This fine wire is even hard to see as it is hair size.
6. The fine wire **Top coil** develops a much higher Voltage than the **Bottom coil**.
7. If moisture gets inside the coil the fine wire of the **Top coil** can corrode open and cause a NO start or a NO run condition.
8. Check the **Top coil** with a battery powered Continuity tester or Ohm meter.
9. If the magneto frame ground return path gets corroded or broken a no run / no start condition can also happen. Be sure to clean off varnish at the Blk. wire Grd. connection..



Unwrap throttle from carb. Install carb. on intake tube and choke lever on handlebar.



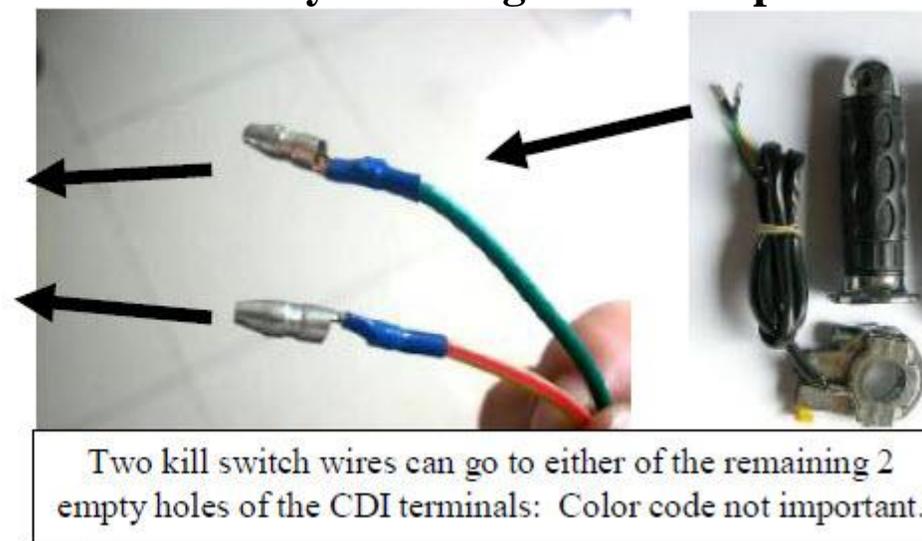
Install CDI module on down tube as far away from engine heat as possible.



Blk. wire from engine to Blk. of CDI

Blue wire from engine to Blue of CDI

For CDI Color code is very important:
Like to Like.



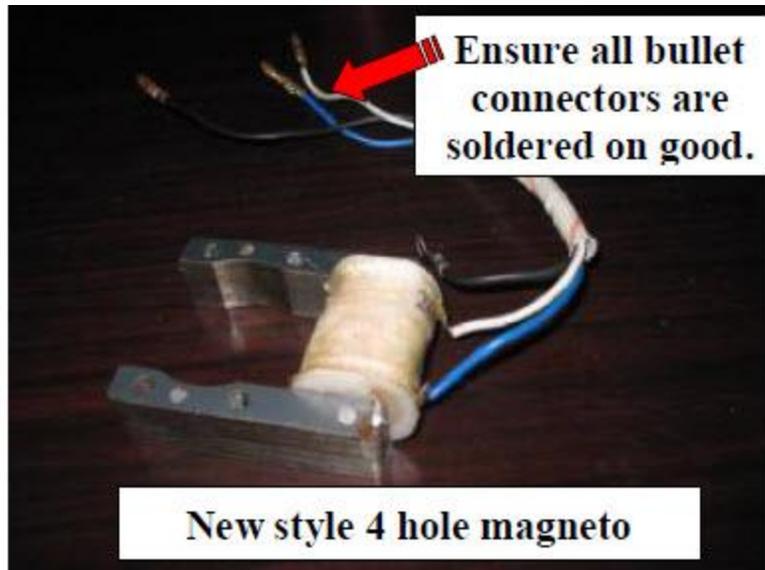
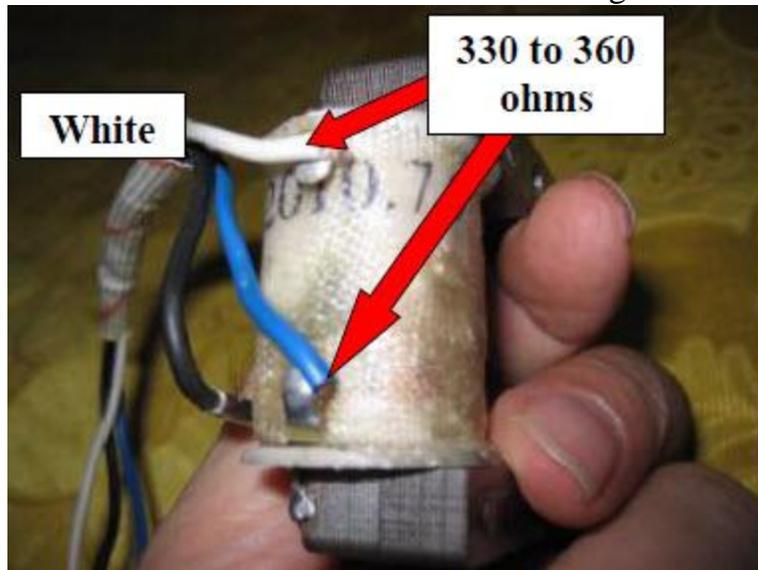
Two kill switch wires can go to either of the remaining 2 empty holes of the CDI terminals: Color code not important.

First install Blue & Black wires from engine magneto to same color CDI wires. **Warning: Do not hook up backwards or damage will occur to the CDI.**

Next install the throttle handle kill switch wires into the 2 remaining open holes of the 2 CDI wire terminals. Push the clear rubber protectors over the 2 connections and tape with black electrical tape. The remaining white wire from the engine is not needed unless you want to run a small wattage 6V headlight but it's not recommended as it will rob engine ignition power requirements so is really best to tape this wire up securely or just snip it off at the engine exit plug. To keep water out of the magneto box use a heat shrink tube over the wire sheathing.



Big Intake Tube is on GT5-SR / GT2-SM / GT2A and a Little Intake is on GT2B / & GT5 Intake gaskets are different: 40mm hole spacing for the big one and 30mm on the little one.

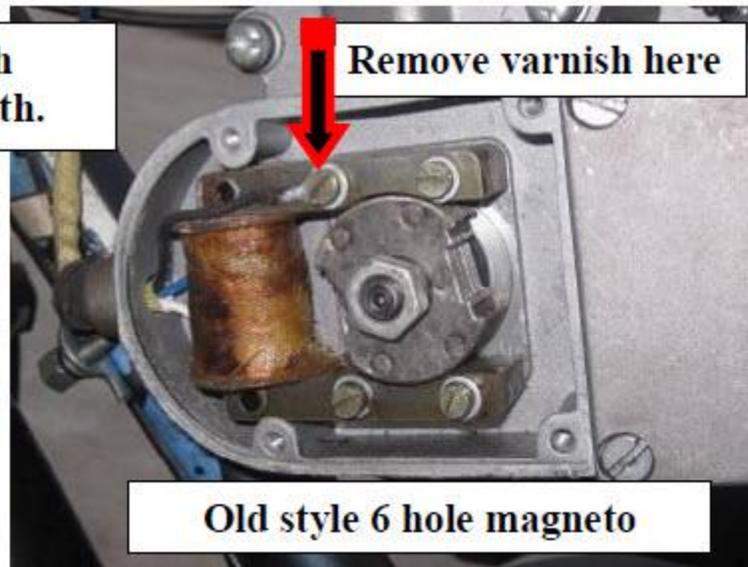


The “Magneto” is the heart of the ignition system and is activated by rotation of a permanent magnet rotor. When a N. / S. magnetic flux field rotates past the magneto coil an induced voltage is sent to the CDI via blue / black wires so as to fire the spark plug at the right time.

When installing a magneto sand off varnish from back side to ensure a good ground path.

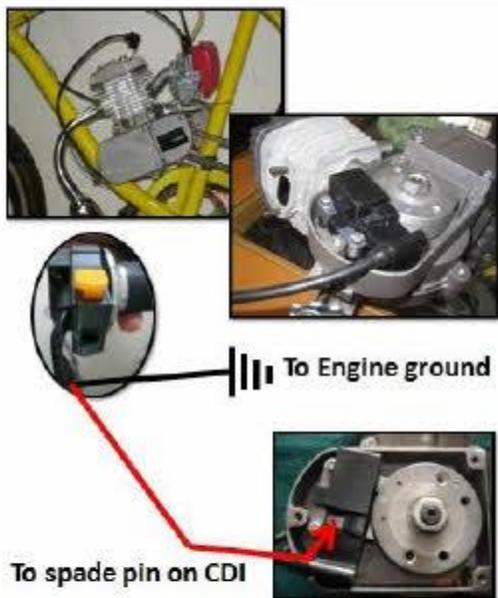


Remove varnish here

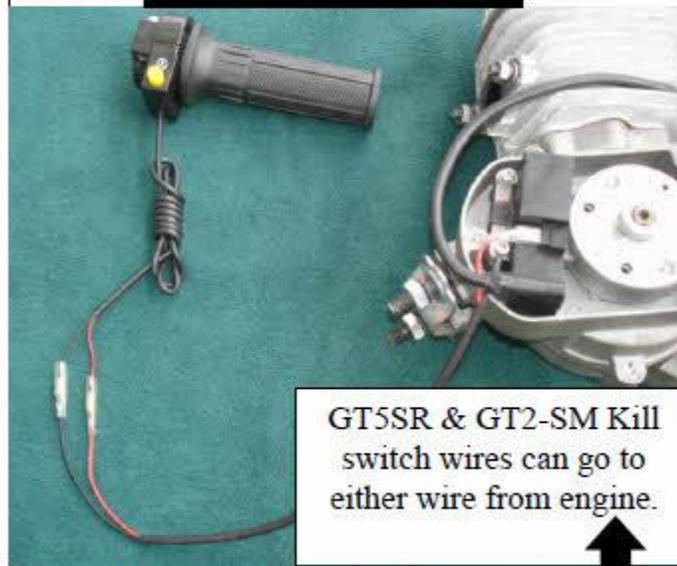
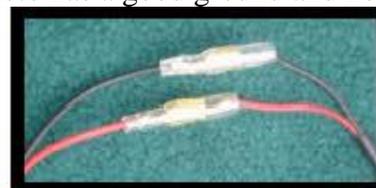


Old style 6 hole magneto

Engine firing timing is not adjustable; Position of p/m rotor is fixed to ensure correct timing. If engine does not fire at start up check all bullet connections. Check if kill switch has an unwanted ground. Make sure magneto has a good ground and not insulated by varnish.



Gt5R SuperRat and Gt2R SuperMouse
Kill switch hook up



GT5SR & GT2-SM Kill
switch wires can go to
either wire from engine.

For GT5-SR and GT2-SM use this kill switch hook up;



2010 / 2011 models have a special CNS YD EPA Carb. especially for Skyhawk engines.

This new carb. has adjustment screws factory sealed and has an external cable choke control. Be sure to check carb. air cleaner attach screws for tightness before installing engine in frame: Air cleaner screws coming loose and entering engine is not warranty; CNS Carb. Service repair kits are available:



CNS-YD Carbs for EPA 2010 have plastic slide and external choke control cable. After January 2011 all have cable adjust top turrets. Note cable lead end and slot position of plastic collar for intake tube.

Procedure for attaching throttle cable to carburetor throttle slide: The small stop on the cable wire slides through the long groove of the carburetor brass cylinder slide. It held in a slot at the end of the cylinder.



(Note component positions in pictures:)

The spring is placed inside the cylinder slide and is compressed when the throttle is twisted. Be sure it is seated all the way inside the cylinder. The spring then forces the throttle to return. For this to work properly the throttle must twist freely on the handle bar in both directions prior to the cable being installed.

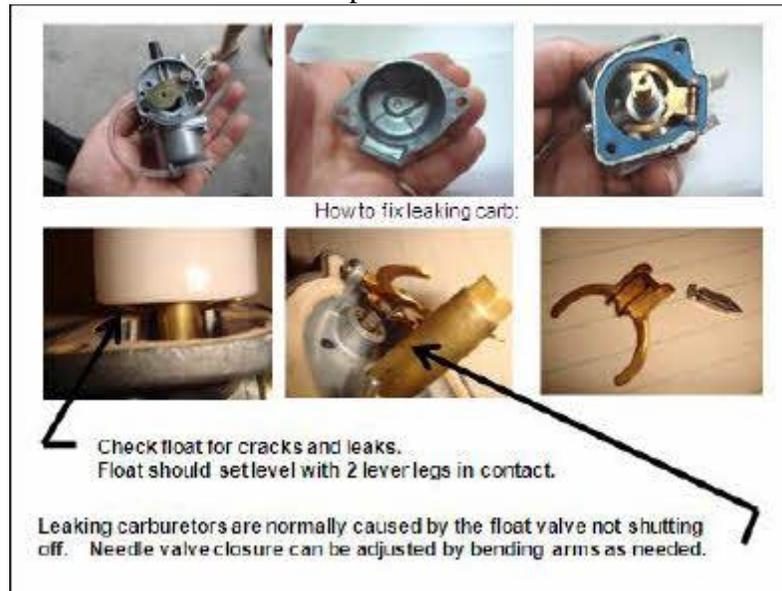
A) Install twist grip throttle on right side of handlebar end. On some handle bars it may be necessary to ream out the handle ID to fit the bar so that the throttle will twist freely. It never hurts to add a few drops of light wt. oil to let trickle down the cable inside the full length of sheathing.

B) After installing cable inside the carburetor you are ready to mount it on engine intake tube and tighten clamp screw. Mount engine so carburetor sets as level as possible.

1. **Note:** Factory Sealed Air /Fuel ratio screw. Factory set by turning adjustment screw to closed position and then opened $\frac{3}{4}$ turns outward or less than 1 full turn before it was sealed with epoxy.

2. Jet Needle comes with clip set in position #2 from the top. Different positions may be required to make your engine run correctly depending on altitude above sea level and fuel economy desired. If a more rich gas mixture is required you can move the jet pin "pac man" clip to the next lower position notch.

SPEED CARB Note: Jet Needle comes with clip set in position #3 from the top. Different positions may be required to make your engine run correctly depending on altitude above sea level and fuel economy desired. If a more rich gas mixture is required you can move the jet pin "pac man" clip to the next lower position notch.



Fuel Tank installation

A) Attach fuel petcock to tank. Use Teflon tape to seal threads. Careful not to strip threads.

B) Mount tank on bike top crossover frame with two supplied brackets and nuts.

C) Attach fuel line from tank to carburetor. Best to use USA made fuel line like GoodYear SAE 30-7 4.8mm obtained from local automotive stores like AutoZone. Factory supplied clear plastic line gets hard over a period of time. ***NOTE:** Filters are contained in the petcock and in the carburetor inlet. If engine

runs poorly clean the valve filter as residue from the tank may have clogged it.. It is highly recommend that a tank liner coating be applied inside the tank before installation. This product is called Kreme and is available from motorcycle dealers;



D) Use a rubber strip to cushion tank on frame top tube.
IMPORTANT: READ THIS:
Gas and Oil Mixture:



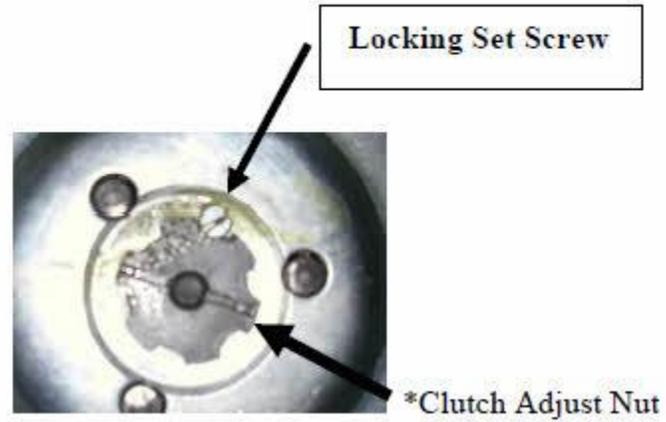
Your engine is a 2 cycle design, therefore, a gasoline/oil mixture is necessary. During the break-in period (1st gallon of fuel), the ratio is 16 to 18 parts gasoline to 1 part oil. After the break-in period, the ratio can increased to 25 parts gasoline to 1 part oil. ***NOTE: Synthetic 2 Stroke Oil** can also be used to insure proper engine lubrication. Consult your WD dealer for his recommendations for your climate and elevation.

!WARNING! Remember safety first: Wipe up any spilled fuel. NEVER fuel a super hot engine or smoke while fueling. This could result in sudden fire, personal injury. Move your Moped at least 10 feet from any fueling area before attempting to start the engine. Never leave the tank fuel cap off after fueling as rain water will contaminate the fuel.

MAINTENANCE SECTION

1. How to Adjust Clutch if signs of slipping or squealing are encountered :

- A)** Disengage the clutch by pulling handle bar clutch cable lever inward and push the lock button in.
- B)** The bike should now roll easily. Release the clutch lever and bike should slide the rear wheel.
- C)** If the rear wheel does not slide when the lever is released this means the clutch needs adjusting.
- D)** Remove the clutch cover and then remove the locking screw that holds the Clutch Adjusting Nut.
- E)** Pull the clutch lever arm on left side of engine inward. Back off the Clutch Adjust Nut ½ turn CCW.
- F)** Release clutch lever arm and check for 1/16" slight clutch arm free-play.
- G)** Readjust *Clutch Adjust Nut as required to get the required 1/6" clutch arm free play.
- H)** Now Repeat the B) roll test. Rear wheel should now slide when the handlebar lever is released.
- I)** Be sure to re-install the small locking screw in outer edge of *Clutch Adjust Nut.
- G)** Good idea to place a small gob of grease at gear mesh area. Use grease sparingly! Then replace cover.
- H)** Squirt light grade oil down clutch cable sheathing to reduce friction and make for easy lever pull.



Instructions: Drive Sprocket & Crankshaft Gear Puller.



This tool is found in the engine kit tool bag: It is used to remove both the output gear B-5 and the 10T drive sprocket.

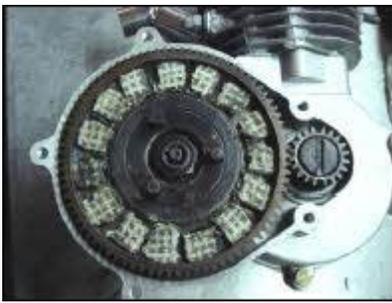


To remove primary 10T drive sprocket secure sprocket from moving and remove nut. Screw in puller tool to the threads in sprocket internal ID.



Tighten puller tool securely;

Hold tool with end wrench while using ratchet on tool bolt to push on the output shaft which causes the sprocket to lift off the shaft.



To remove engine B5 gear;



Secure clutch gear and remove slot head nut;



Remove star washer;



Reverse bolt in puller tool;



Secure tool in output gear;



Hold tool with end wrench and ratchet bolt CW to remove gear.

2. Carburetor

Per instructions from the Dept. of EPA the idle and air fuel mixture screws have been epoxy sealed at the factory to avoid end-user tampering. Depending on dusty riding conditions, clean air filter every 5 to 20 hours of operation by removing the filter cover to access the screen and element. Wash element with a degreasing agent such as Simple Green™ or Purple Stuff™. Be sure element is completely dry before re-assembly. **IMPORTANT: If engine runs poorly clean tank shut off value filter. If engine needs more fuel to run more powerful move the pac-man clip on the needle down to the next notch position.**

#3. 3 pt. Spark Plug

Remove spark plug and inspect for excess carbon build up. Clean, re-gap to .036" of an inch if necessary. Check plug after every 20 hours of operation. New spark plugs are available from your selling dealer. Be careful using aftermarket spark plugs as heat range and threads differ greatly. An extra plug is included:

#4. Exhaust system

After 50 hours of operation check exhaust pipe for excessive oil and carbon build-up. If muffler is clogged your dealer has replacements. Make sure attaching nuts are tight and no exhaust leaks are occurring. Be sure to use supplied support strap to secure exhaust muffler to a solid anchor point on bike frame or engine.

A) To remove inside catalytic exhaust insert loosen the retaining screw on end cap and remove.

B) Pull cap and baffle out of pipe. Note: Some catalytic inserts are welded in and cannot be removed. If you need a replacement muffler contact your dealer. 2010 models have an air shield welded on the outside of muffler again per EPA rulings. This insures hot run so catalysis can clean the exhaust.

C) Clean with degreaser, rinse and dry. Re-assemble: File muffler attach flange to have smooth flat surface.

D) Always use a new exhaust gasket and good idea to use double nuts on muffler attach studs;

***NOTE:** Excessive periods of low speed operation, idling or leaving fuel petcock in the "on" position during shut down periods may cause the muffler to become clogged with unburned fuel.

#5. Standard Bike 1/2x1/8" Chain is included in kit. HD 415 is available as an option.

Every time the bike is ridden check the tension of the drive chain by:

A) Rolling to bicycle forward to remove slack from the bottom of the chain.

B) Find the center and push downward on the top of chain while measuring the deflection.

C) Tighten chain if deflection is more than 1/2 inch.

#6. Head Bolts Tighten all fasteners after each five hours of operation. Most important to check

Cylinder head bolts : Tighten in a X pattern to 10 ft/lb using a torque wrench. A two piece cylinder and head design engine requires head bolts be kept tight. Important: Check head bolts before each and every long ride, vibration can cause them to loosen and blow a head gasket. Caution: Do not over torque or head bolts may break off. (Twisted or broken head bolts due to over tightening is not covered by warranty.)

#7. Right side gears: Remove cover plate and keep small amount of heavy grease on gear train.

Do not over grease as leaks will occur and also may adversely affect clutch operation. Regular greasing will help reduce gear wear and keep gear train quiet.

#8. Left side drive: Routinely pack grease in the shaft hole behind 10T sprocket. This will also help deduce noise.



SkyHawk Engine ID plates:

General Information

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 through way or sidewalk while the engine is operating. Never operate your motorized bicycle in an unsafe manner. **Check local and state laws before riding on streets & wear a helmet.**

ENGINE STARTING & OPERATION PROCEDURE

IMPORTANT: PLEASE READ THIS: Gas and OilMixture for Fuel ratio

The engine is a 2 cycle design, therefore, a gasoline/oil mixture is necessary. During the break-in period (1st gallon of fuel), the ratio is 18 parts gasoline to 1 part 2 cycle oil. After the break-in period, the ratio is increased to 25 parts gasoline to 1 part oil. The engine crankshaft bearings are lubricated from the oil in

the gas mix. A rich break in mixture ensures bearings will not cease. **!WARNING! Remember safety first: Wipe up any spilled fuel. NEVER fuel a hot engine or light a cigarette while fueling. This could result in sudden fire, personal injury. Always move your motorized bike at least 10 feet from any fueling area before attempting to start it. Never leave the tank fuel cap off after fueling as rain water will contaminate the fuel and cause engine failure.**

Step #1. After filling tank with the correct oil/gas mix open the tank fuel valve. Fuel line is in the open position when the small lever is pointed down. **Move choke lever to the on position.** This is the small lever at the end of the choke cable **All the way Up the choke is on. All the way Down the choke is off.**

Move progressively downward to off position during engine warm up period.

Engine Starting procedure for Lever Clutch Models:

1. Pull the handlebar clutch lever inward, to disengage the engine from the rear wheel.
2. Pedal; (down hill if possible for first start)
3. A mid frame or rear wheel bike stand is helpful to start the engine in place.
4. Let out the clutch lever all the way out and continuing to pedal. The result is a direct engine hook up via the friction clutch with the rear wheel via chain and sprocket. The engine will now start spinning, Pedal until motor starts. Accelerate slowly at first..
5. Twist throttle to increase speed, reverse twist throttle to decrease speed. To stop, disengage clutch and apply brakes. To accelerate, pedal and release clutch while opening throttle.
6. Adjust choke to the smoothest engine running position.
7. **After warm up push choke lever all the way down.** If engine races too fast, or too slow, pull clutch lever and lock in the notched catch, stop and adjust engine rpm.
8. If the rpm needs adjusting, turn the idle adjust screw (left side of carburetor) in or out slowly to obtain the proper idle speed of about 1400 rpm +/- 100 rpm

To correctly break the engine in, Do not exceed 15 mph or 30 min. continual running for the first 50 miles during engine brake in. **Engine will develop more power after break in.**

9. To stop the engine, push Kill switch and turn off gas valve at tank. Turning off the gas will prevent fuel from being siphoned from tank. **Warning Note:** Never leave the tank gas valve in "open" position" when engine is not running or the bike is in storage.

10. After or before each ride check all mounting fasteners, including hd. Bolts, axle and brakes.

11. Warning Note: Engine lock up or piston seizure due to improper gas / oil mixture will not be covered by factory warranty. This the responsibility of the owner / operator to make sure the gas and oil is mixed correctly.

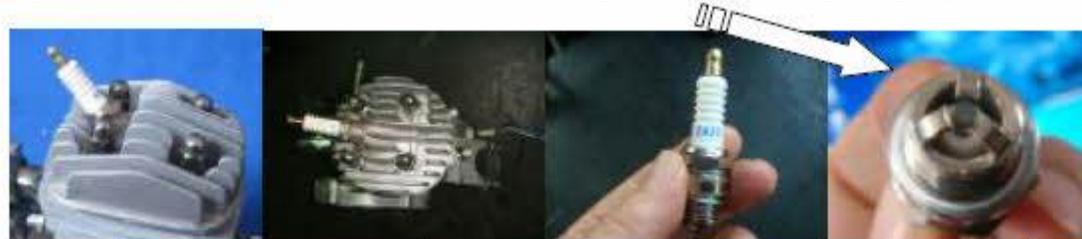


Special Items, tools and extra service parts in tool kit;

ENGINE WARRANTY POLICY:

Proper use and maintenance is required for the continued enjoyment of your Bike Engine. This product has been manufactured to strict quality control standards. For product warranty policy contact your selling dealer. Warranty approval is subject to factory inspection and only the defective part or parts will be replaced, not the complete kit or engine. Only the defective part or parts should be returned to the selling dealer for warranty replacement consideration. Your dealer may require you to obtain his authorization first before returning defective parts. Include description and picture of failure with as many details as possible. Note: Seized pistons due to improper gas / oil mix or shipping damage due to carrier neglect is not warranty.

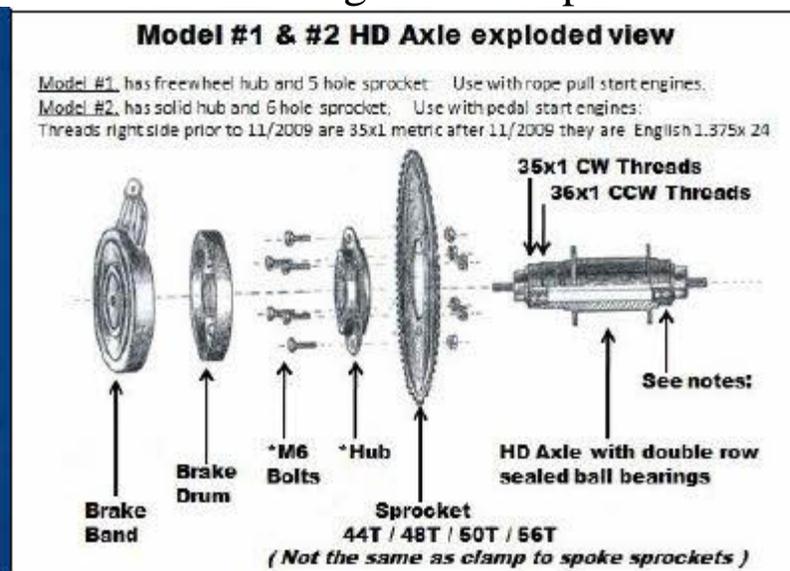
When replacing the spark plug in an Angle Fire head it's best to use a 3 point electrode spark plug P/N Z4JC to ensure total combustion.



Chrome parts for engine dress up are available from your selling dealer;



Ask your dealer for the China GAS Alum. frame w/ built in gas tank & pedestal mount.



For a ProShop installation ask your dealer for the China GAS Model #2 HD axle kit;
 (Complete assembled Rear Wheels for 1 speed or Multi speed 26" bikes are available.)

Some SkyHawk WD distributors in the USA and Australia have complete rear 26" wheels with the Model #2 HD axle pre-installed. This is the pro-shop installation route. Double wall HD rims and 12 ga. spokes.



GruBee HD axles avoid clamping the engine driven sprocket to spokes. Instead said sprocket is bolted to a screw on CCW hub and lock ring that assures true alignment and enhances long lasting durability.

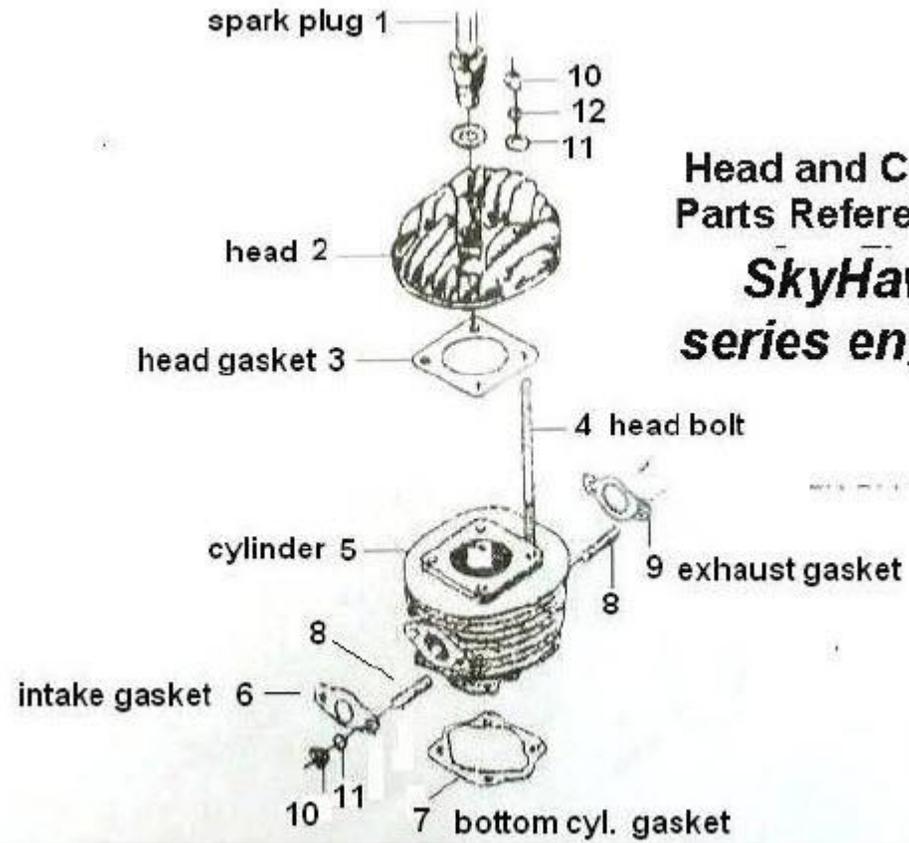
Failing to follow these instructions when installing a certified engine in a piece of non-road equipment violates Federal Law 40CFR-1068.05 (b) and is subject to fines or other penalties as described in the Clean Air Act of 1970.

When replacing the spark plug in an Angle Fire head it's best to use a 3 point electrode spark plug P/N Z4JC to ensure total combustion. (Ask your selling dealer for it by part number.)



Parts Reference:

A.



Head and Cylinder
Parts Reference for
SkyHawk
series engines



Integral CDI



Big Boss Wheeler



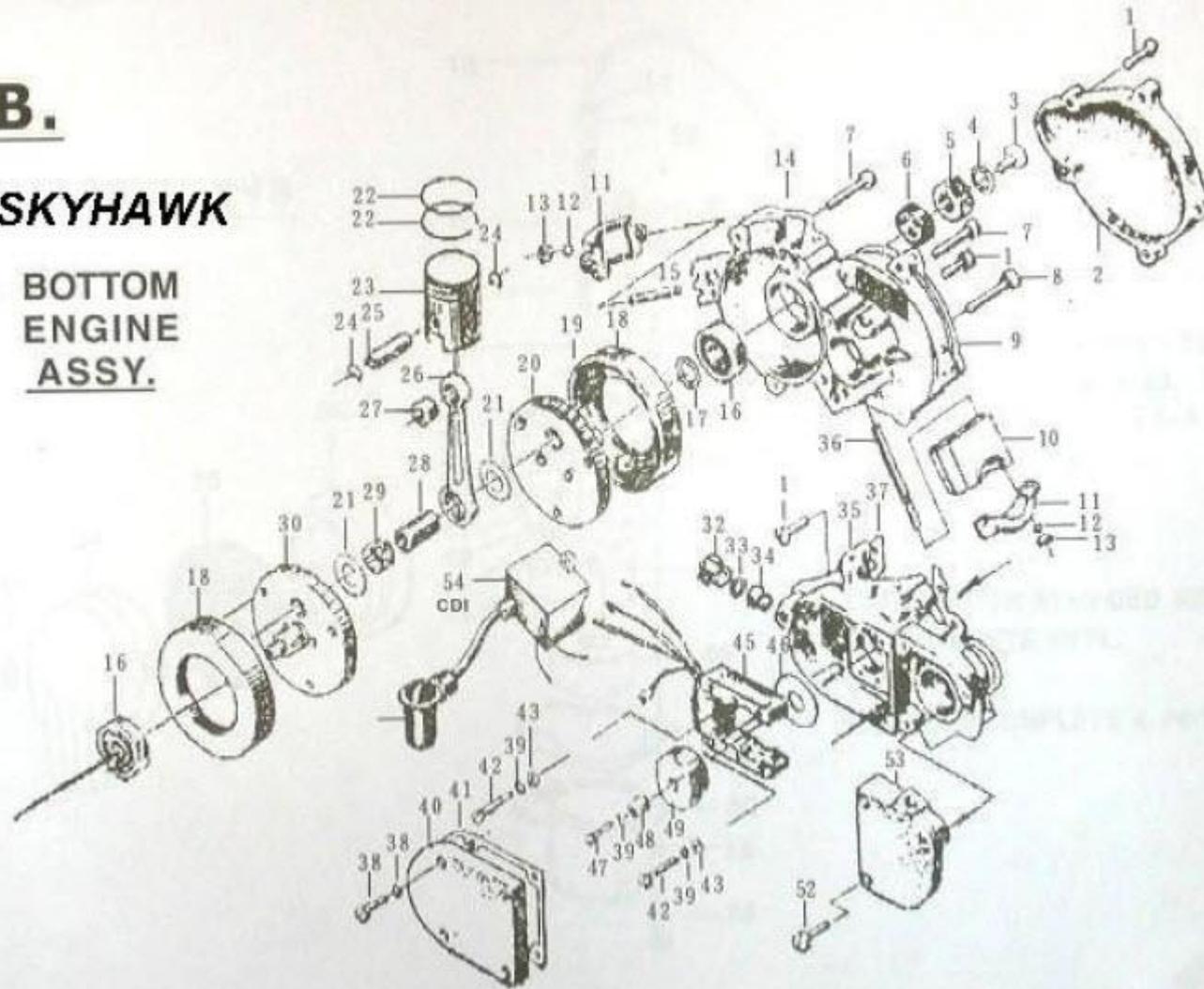
Fan cooled

GT2-SM
GT5-SR

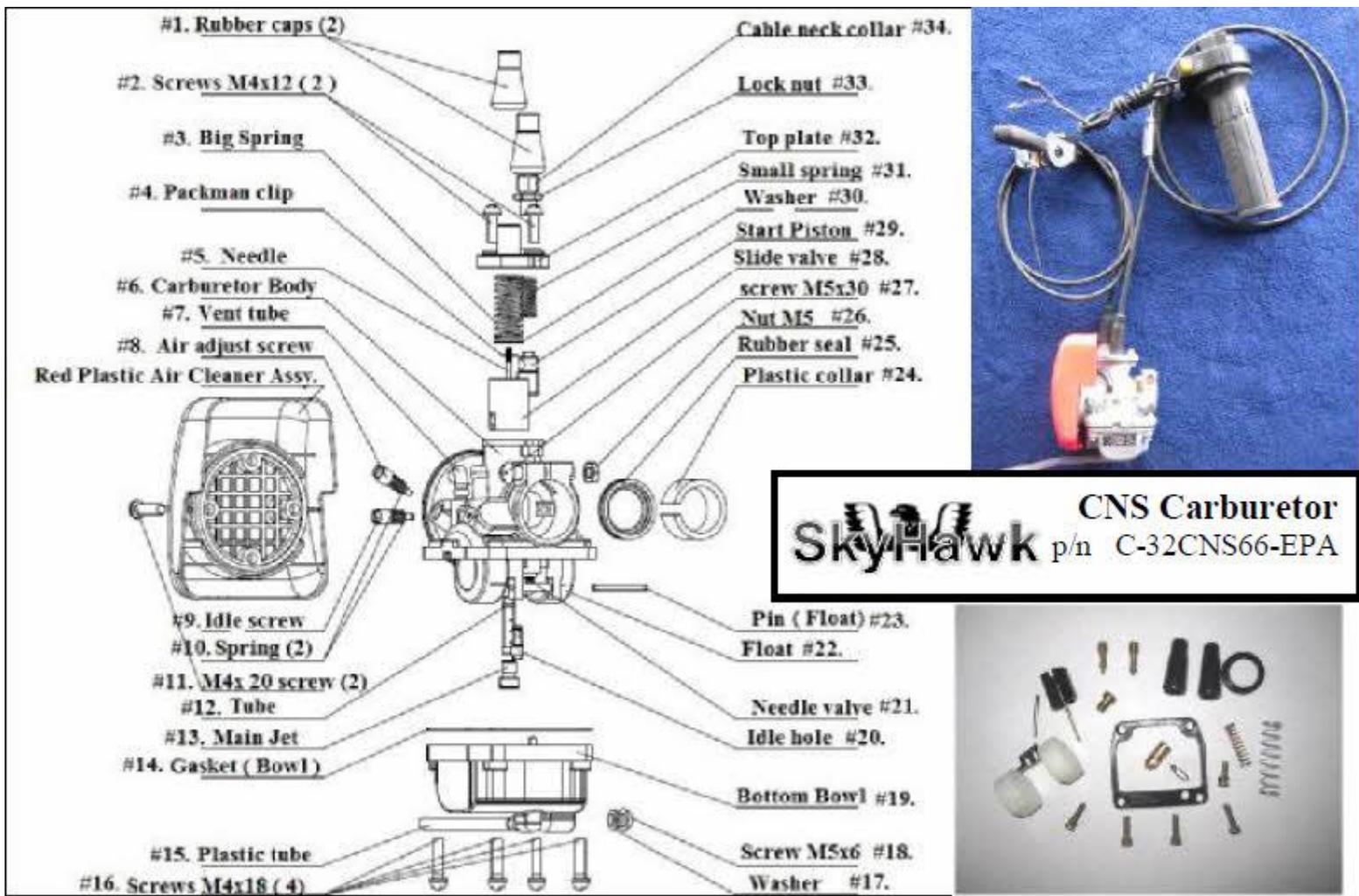
B.

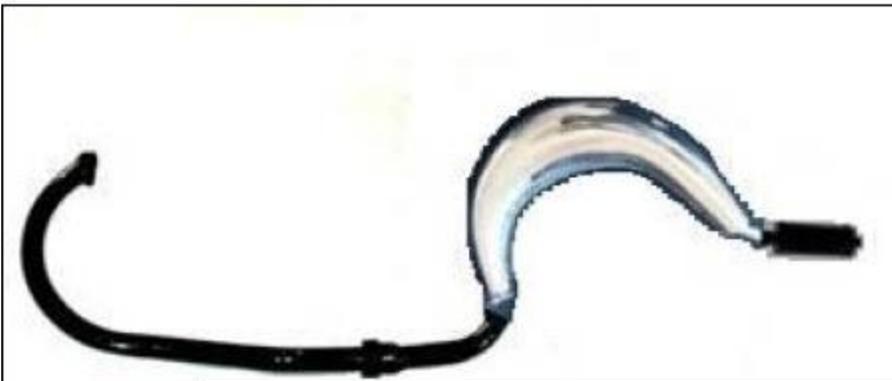
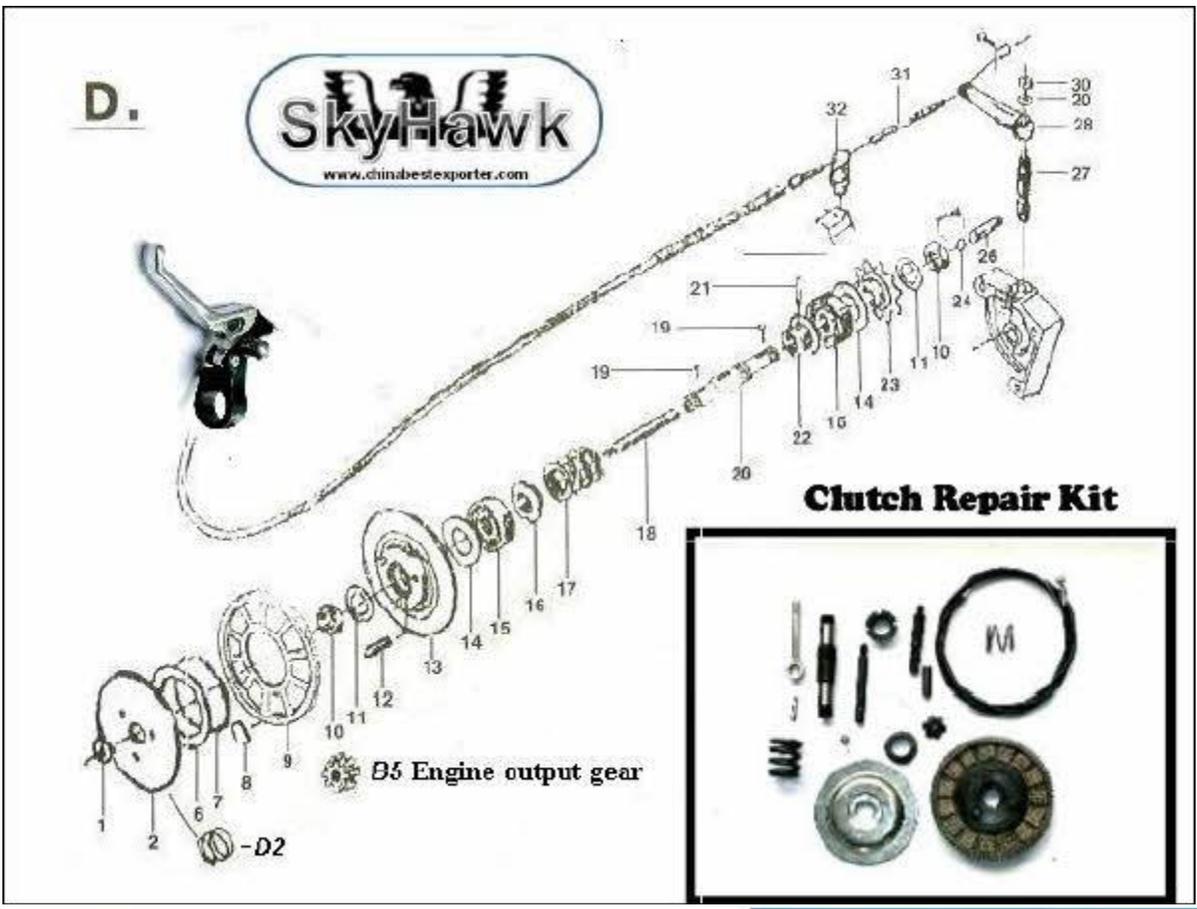
SKYHAWK

**BOTTOM
ENGINE
ASSY.**



GT5 and GT2B





Long & Short expansion chamber racing exhaust



Improved catalytic muffler for 2010 EPA requirements with twice the size of palladium insert plus an outside air shield;



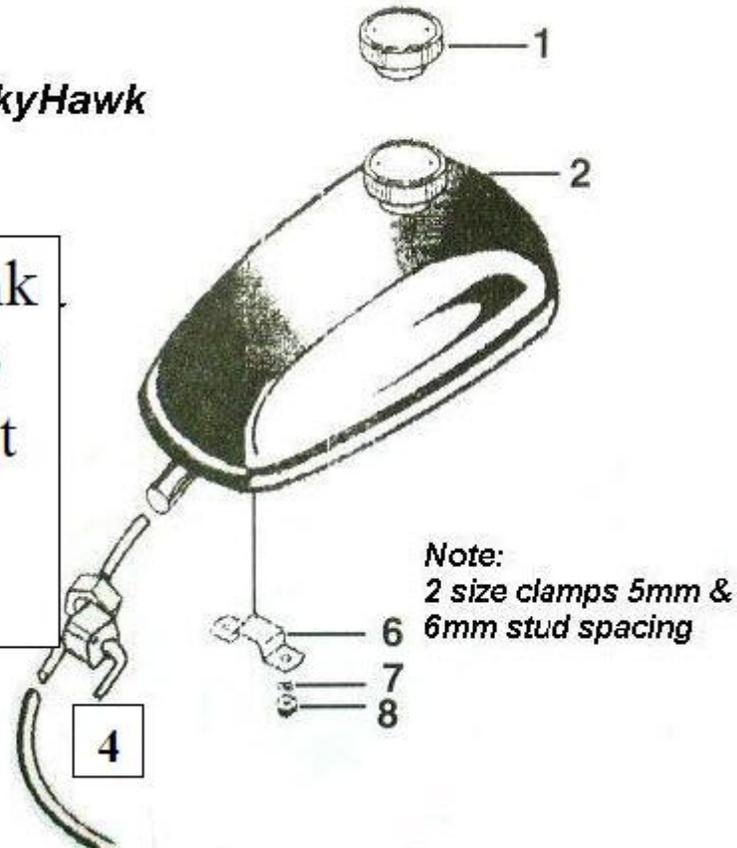
Two psc. STREET POO POO PIPE available in dealer service parts.



E.

Star-Fire and SkyHawk

2.5 liter gas tank plated inside to help reduce rust from occurring



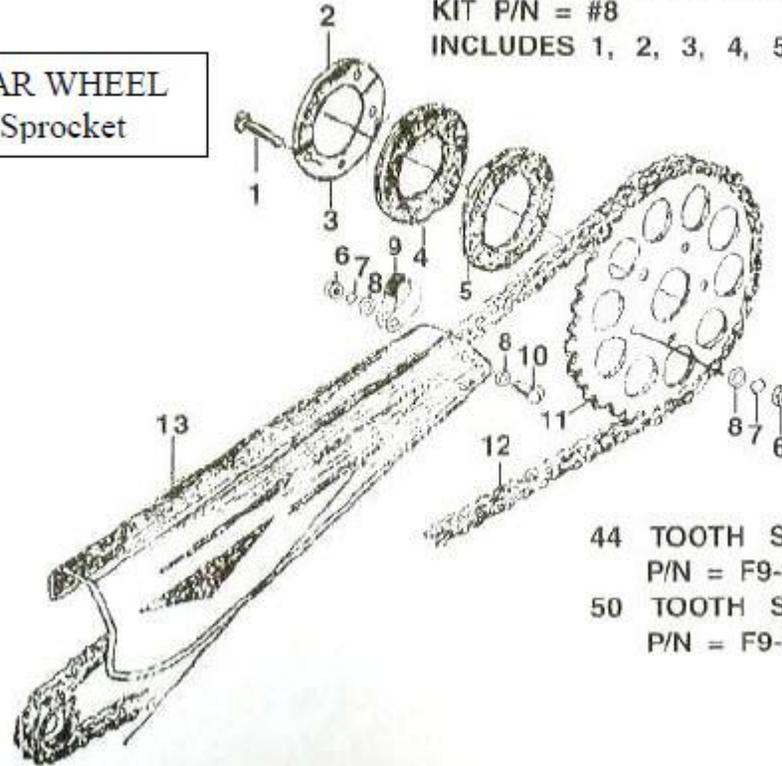
F.

44T REAR WHEEL
Drive Sprocket

SPROCKET INSTALLATION

KIT P/N = #8

INCLUDES 1, 2, 3, 4, 5, 8, 7, 6,



44 TOOTH SPROCKET

P/N = F9-11-44T

50 TOOTH SPROCKET

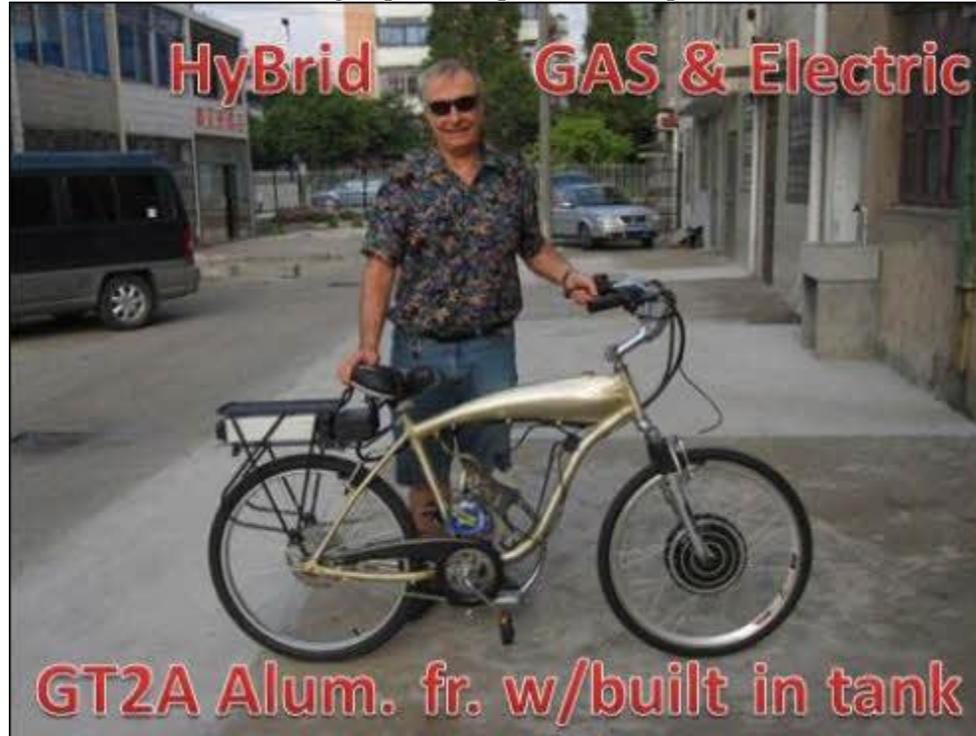
P/N = F9-11-50T



SuperRat Gt5-SR & SuperMouse GT2-SM have intake tubes with boss for bottle boost connection.

Boost Bottle theory is that the bottle at the end of the plastic tubing line has cc capacity equal to one cylinder displacement or larger. Said bottle container momentary is a storage location for pre-atomized air / fuel mixture. The air / fuel mixture from the carburetor moves at high velocity while traveling through

the intake manifold heading toward the piston cylinder. When the piston moving upward suddenly closes off the intake tube opening the air/fuel mixture has inertia that carries it into boost bottle container. This inertia (pulse) forces the pre-atomized mixture that's already in the tube from the previous cycle into the intake manifold that's ready to receive the air / fuel mixture when the piston moves downward. Compare this process to a little supercharger for each piston cycle. This happens very fast at higher rpm's meaning that bottle boost is most effective at lower and mid-range rpm. It takes time for venturi velocity to atomize raw fuel from the carburetor main jet. The tube / bottle has a charge of pre-atomized fuel that is instantly ready when the operator is going off and on the throttle. It assists in filling the cylinder for a fraction of a second until the carburetor venturi gets enough velocity to fully atomize the available fuel. The advantage of bottle boost is that it brings up the torque and horsepower sooner in the lower rpm ranges.



A front wheel 36 volt motor is one way to have an electric starter for your pedal start engine.

SkyHawk 2 cycle engine trouble shooting guide

<i>Symptom</i>	<i>Possible causes and corrections</i>
No Engine Start	#1. Carburetor choke: Choke Lever down if engine is cold, if hot; choke lever up.
	#2. Possible flooded engine. Try starting with throttle wide open. If no start go to step #3.
	#3. Check spark plug; Replace if black and worn electrodes are found. Pedal spin engine with spark plug remove to clear possible wet cylinder. Re-install plug: If no start go to step 4.
	#4. Use plastic pliers to hold spark plug wire end approximately 1/8" to 3/16" away from spark plug tip and spin engine over by pedaling with rear wheel held up. If spark is strong and normal then go to step #9. If no spark then go to step #5.
No Spark	#5. Check CDI ignition blue and black wire connections . If good and tight then go to step # 6.
	#6. Disconnect kill switch wires and try starting. If engine starts then look for an unwanted ground in the kill switch circuit. If engine still does not start then go to step # 7.
	#7. Check magneto coil with an ohm meter. Look for approx. 300 to 350 ohms across blue and black wires. Check for loose screws and or high corrosion. If open or shorted coils are found replace magneto coil. If magneto coil is known good then go to step # 8.
	#8. Replace CDI module. If still no start go to step #9.
	#9. Possible Flooded engine: go to step #2. No flooded engine confirmed then go to step #10
	#10. Check for fuel restriction. Remove line at carb. and check for fuel flow. Clean filter on tank valve. Clean any inline filter. Make sure gas is not over rich with too much 2 cycle oil. 16 to 1 ratio with a brand new engine and 25 to 1 with a used engine. If no start > go to step #11
	#11. Check for air leaks at carburetor intake manifold tube. Check for loose manifold nuts, Check for loose carburetor and or damaged intake gasket. Clean clogged or dirty air cleaner. Make sure engine does not have fuel in bottom of crankcase due to unwanted entry of drip down gas from above tank. Still no start then go to Step #12
	#12. Check throttle cable. Make sure it is moving slide valve up and down in carb. Still no start then go to step. #13.

Good Spark but Engine will Not Start	#14. Check crankcase for possible air leaks. Check left and right oil seals on ends of crankshaft to see if correctly seated in front of bearings. Push the piston down to lowest position and plug up exhaust and intake ports so you can use a hand held compression pump to see if any air escapes from crankcase. Be careful to not blow out the oil seals with too much pressure. If the crankcase gasket is leaking and needs replacing it's best to have a qualified mechanic replace the gasket. If no air leaks are found and you have a no start engine condition then go to step #15.
	#15. Run a cylinder compression check by removing the spark plug and installing a small engine compression gage. Plug the exhaust and intake ports with a custom made flat plate. Use a hand held electric drill or an air wrench to turn the crankshaft at the magneto nut. Note: If the engine turns over easily with the spark plug or a compression gage seated in the engine head this means you have a blown head gasket, broken rings, or a possible hole in the top of the piston. You will now need to remove the 4 head bolts and head to make further checks. Note: If compression is good and no problem is found then proceed to step #16.
	#16. Replace or rebuild the carburetor and correctly set idle speed adjustment. If still you have a no start engine condition then probably it's best to consult with a qualified engine mechanic as somewhere in the trouble shooting process something has been over looked.
Engine backfires and is hard starting.	Check magneto Rotor for being on backwards. With piston at Top Dead Center the crankshaft key must be at 1 o'clock position. The 2 Rotor dentures need to be in a parallel position with the 2 Magneto arms.. If not this way then remove the Rotor and turn it over. To learn more see the Great Magneto Mystery at www.grubeeinc.com
Engine does not reach max RPM	Check for clogged muffler. Clogged exhaust port. Fuel restrictions, Low compression, Poor ignition spark, Too much oil in gas or improper air/fuel mixture in carb. Clean carb. jets and air filter; Check for a possible crankcase leak or leaking oil seal.
Engine has high rpm but no pulling power.	Check clutch gear wheel for worn or greasy clutch pads. Replace worn clutch pads and adjust as required as described in owner's manual.
Engine idle is too fast or too slow	Adjust idle screw air fuel mixture settings. Refer to your owners manual. Adjust cable stroke slide valve adjustment at top of carb if possible, some early made YD CNS carbs do not have this feature.
Engine has high pitched squeal	Check for bent clutch rod. Check clutch adjustment. Refer to your owner's manual.
Clutch will not release	With clutch engaged check for 1/16" slight free play on the left side engine clutch arm to insure correct adjustment. Remove clutch cover on right side of engine and check for possible stuck
Engine will not spin over when clutch lever is released while pedaling.	Clutch cable may be adjusted too tightly. Check for 1/16" free play in clutch arm on left side of engine. When clutch is engaged the clutch arm on the left side of engine should be setting in an approximate parallel line up with the side of the engine. Remove clutch cover and check to see if the clutch plate is stuck open in the disengaged position.

The end of your Kit Box denotes contents:



SkyHawk Gt2B 48cc Round Head

Eng. Finish	➡ Alum.	Chrome	Black	Blk/Ch.
Sprocket	➡ None	44T	X 48T	56T
Drive Chain	➡ 410	X 415		
Chain Idler	➡ Std.	88	X	
AngleFire Hd.	➡ yes:	X no		
Integral CDI	➡ yes:	no	X	
Crank brgs.	➡ 205	202	X	
Intake tube	➡ Big	X Small		
Clutch lever	➡ Push b.	X #5 Flipper		

Gross Wt.	11.1 Kg.
Net Wt.	10.6 Kg.
Box size:	40.5 x 29.5 x 18.5cm



SkyHawk GT-2A 48cc Square Head

Eng. Finish	➡ Alum.	Chrome	Black	Blk/Ch.
Sprocket	➡ None	44T	X 48T	56T
Drive Chain	➡ 410	X 415		
Chain Idler	➡ Std.	88	X	
AngleFire Hd.	➡ yes:	no	X	
Integral CDI	➡ yes:	no	X	
Crank brgs.	➡ 205	X 202		
Intake tube	➡ Big	X Small		
Clutch lever	➡ push b.	X #5		

Gross Wt.	11.1 Kg.
Net Wt.	10.6 Kg.
Box size:	40.5 x 29.5 x 18.5cm



SkyHawk GT2-SM 48cc Square Head

Eng. Finish	➡ Alum.	Chrome	Black	Blk/Ch.
Sprocket	➡ None	44T	X 48T	56T
Drive Chain	➡ 410	X 415		
Chain Idler	➡ Std.	88	X	
AngleFire Hd.	➡ yes:	X no		
Integral CDI	➡ yes:	X no		
Crank brgs.	➡ 205	X 202		
Intake tube	➡ Big	X Small		
Clutch lever	➡ push b.	X #5		

Gross Wt.	11.1 Kg.
Net Wt.	10.6 Kg.
Box size:	40.5 x 29.5 x 18.5cm



SkyHawk Gt5 66cc Square head

Eng. Finish	Alum.	Chrome	Black	Blk/Ch.
Sprocket	None	44T X	48T	56T
Drive Chain	410 X	415		
Chain Idler	Std.	BB X		
AngleFire Hd.	yes:	no X		
Integral CDI	yes:	no X		
Crank brgs.	205	202 X		
Intake tube	Big	Small X		
Clutch lever	push b. X	#5		

Gross Wt.	11.6 Kg.
Net Wt.	11.1 Kg.
Box size:	40.5 x 29.5 x 18.5cm



SkyHawk GT5-SR 66cc Square Head

Eng. Finish	Alum.	Chrome	Black	Blk/Ch.
Sprocket	None	44T X	48T	56T
Drive Chain	410 X	415		
Chain Idler	Std.	Ball Brg. X		
AngleFire Hd.	yes: X	no		
Integral CDI	yes: X	no		
Crank brgs.	205 X	202		
Intake tube	Big X	Small		
Clutch lever	push b. X	#5		

Gross Wt.	11.6 Kg.
Net Wt.	11.1 Kg.
Box size:	40.5 x 29.5 x 18.5cm