



## **Fitting instructions for ZBOX Super Z50-3 and Super Z80-3 bicycle engines**

**Please take the time to read these instructions  
before commencing your project.**

Some mechanical ability is very desirable to properly install your engine. Some buyers can complete the job in 2 hours whilst others may take 2 days. It is not important how long it takes - you will gain great pleasure and satisfaction from doing the job right. Have fun. The easiest installation is performed on the standard v frame 26" bike with 25mm round tube frame. It can be mounted to some other bikes but it best to stick with the standard bike. Some motors come with a frame adapter plate for fitting to non standard oval or larger tube configurations. If time and care is taken with the initial installation and ongoing maintenance, you should have many thousands on kilometers of trouble free operation.



Vibration is a factor with all single cylinder bicycle engines so it is a good idea use a spot of 'Holdtite' or 'Loctite' on all screws and nuts when installing the engine. If the head nuts vibrate loose they will cause the head gasket to blow and if the side cover plates come loose it will let water into the magneto and cause damage to your electrical system. Engine mounts can also vibrate loose.

[click here](#) for operation overview of 2 strokes



Fitted engine

## **INSTALLING REAR SPROCKET**

### **STEP 1**

There are two rear sprocket rubber packers. Cut only one of them. Cut between the drilled holes.



### **STEP 2**

Place the cut one inside of the spokes.



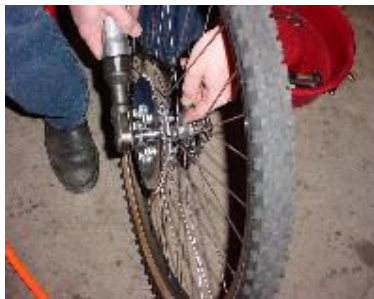
### **STEP 3**

Place the other packer on the outside of the spokes.



#### **STEP 4**

Thread the nine bolts through the sprocket and use the half moon backing plates on the inside. Tighten all nine bolts moving across in a star fashion and a little at a time to allow for an even pull down. Once the sprocket is tight, spin the wheel and check that the sprocket runs true. Deviation can be no more than 1.5mm both ways. Any side-to-side excess deviation can be corrected by spinning the wheel and then tightening the sprocket where needed in order to get correct alignment. Make sure bolts are tight. Notice that concavity or indentation of teeth of the rear sprocket is inward towards spokes. This helps keep the chain closer to the inside of the wheel and spokes and allows for better clearance of the rear stays of the bicycle frame.



#### **STEP 4 COMPLETED**

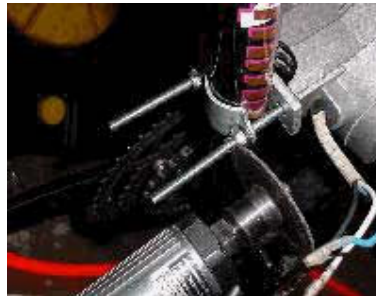
Here is how it looks when completed. Nice, tight and true.



### **MOUNTING ENGINE TO FRAME**

#### **STEP 5**

Mount the engine into the frame. This is the front motor mount. Some bikes have a large diameter lower bar and some need clearance for the air box intake so you need to use the parts provided in the kit. Use spacer provided with the kit. This spacer normally would require the drilling of a hole in the frame to bolt the centre of the spacer through (shown below). I prefer the method shown, which is to pull the studs and replace them with longer ones (threaded rod) that you can get at the local hardware store. Then you can use the steel motor mount clamp that came with the kit and not have to drill a hole in your frame. Then cut the excess off. My bike had an ovoid shaped lower bar about 50mm across. I used this method.



Here is how the front motor mount looks if you have to use the 3 hole adaptor. Yes, you drill and as you can see it works perfectly and you may have to get a longer bolt and bend the exhaust pipe some too. To bend the pipe, simply get a vice and use some wood to block the pipe and then bend it. ZBox has made special galvanised U-bolt adaptor assemblies for \$10 extra if you don't want to drill a hole through your front tube.

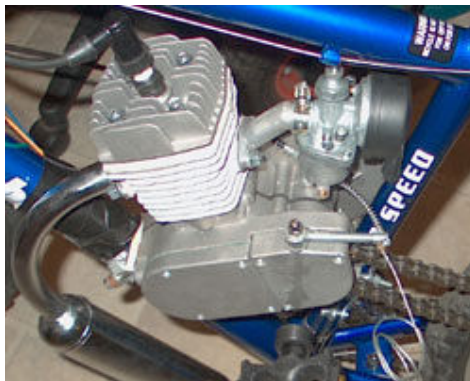


ZBox U-clamp large frame adaptor



### **STEP 5**

Here is step 5 complete with studs nipped and looking good!! Notice how well the intake inlets clear. Always mount air intake with inlets down! Always! If you need to, you can put the air box on a grinder and cut down on the inlet tubes a little to make sure they clear the frame. If you use the spacer on the front engine mount, usually this is enough to clear. Also, you may need to file down any water bottle screw mounts if they protrude and are in the way of a engine mount.



## **FITTING CONTROLS**

### **STEP 6**

The new style throttle is fitted to the r/h side of the handle bars - before you slip the throttle onto bars you will need to drill a 5mm hole in the handle bar 125mm from the end to locate the plastic throttle location tit. Put a drop of machine oil into the cable sheath whilst you have it apart. Care should be taken with the cable location grove - if you are too rough with it, you will break it. Be gentle when installing the throttle. The throttle has a kill switch incorporated into it. Earth the kill switch anywhere on bike frame using the wire with the lug on its end. Attach the remaining kill

switch wire to the white wire from the engine. Pressing kill switch will cut power to the spark plug and stop engine running. If your bike has twist action gear shifter it may cause problems when fitting your throttle. The twist action gear shifter can be replaced with a thumb action gear shifter available from any bike shop or from the ZBox spare parts page for \$15.



### **STEP 7**

Mount the clutch lever.

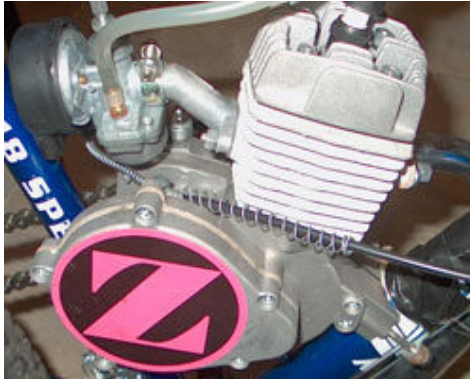


### **STEP 7 COMPLETE**

Here is what the clutch cable connection should look like at the motor.



The larger spring is a heat shield for the clutch cable:



### STEP 8

Screw in the fuel valve filter combo into the tank and then mount the tank. Tip... Wrap top frame tube with bar wrap where tank clamps are. Also, if you have cable runs on the top bar that are open cables, you may need to run them through cable sheath the length of the tank in order for them to work once tank is clamped over them. Apply plumber's tape to thread if leaking.



### STEP 9

Mount your coil. Tip...Use 2 high quality cable zip ties. Go up and over and around the coil and zip tie it to the frame. Loop one zip tie up and over and also through the holes that would normally have the screws going through them. This is a better method than using the screws that come with the kit. You will have a more solid mount and not break the coil. It is not hard the break the coil ears off using the screws. Wire Connections: Blue to Blue and Black To Black.

Engine vibration can often cause the HT lead between the black box and plug cap to come loose. If this happens you will have no spark so twist the HT leads in a clockwise direction at both ends to close connection.

It is very important to ensure the cover plate on the magneto remains tightly sealed (use 'Holdtite' or 'Locktite' on screws). If water is allowed to get into the magneto chamber, it will cause the magneto to fuse out. Also seal the wire outlet with silicon or similar sealant to ensure water is not carried into the magneto via the

wires. Silicon sealant and 'Holdtite' is available on the ZBox spare parts page.



Testing resistance on magneto coil should read:  
blue to black = about 340ohms; black to white = 2.3ohms

**Special Note:** If your spark plug has its crown screwed on. Unscrew it and remove it so that you can put your spark plug cap on. Failure to remove this crown can damage or ruin the spark plug cap.



Here is what the idler pulley looks like installed. Notice the wheel is at the most down position so as the chain gets slack, you simply move the wheel upwards to take out the slack.



### **STEP 10**

Remove the 3 screws from Counter shaft side cover and also remove spark plug. Remove clip from master link of chain and then thread chain up and over counter shaft sprocket by rotating the sprocket using tool. Having the spark plug removed allows engine to be turned easily to thread chain. Tip... Since you have this cover off, hold clutch arm and rotate cover and pull clutch arm out of cover and then grease it and rotate it back in. ZBox engines are fitted with an extra heavy duty 415 chain so it is a good idea to remove the sharp tips from the small drive sprocket with a file or grinder to ensure smoother travel of the chain over the teeth.



### **STEP 11**

Put some molly grease on the shaft and in the hole.



### **STEP 12**

Cut chain to length and using master link put chain back together. Do not cut chain too short! Install idler pulley. Do not over tighten chain. Install chain guard. Use some tin snips to cut cover at the rear if needed. Use a good zip tie at the rear and the extra long bolt for the counter shaft cover will hold the front.

If you ever need a new chain and can't buy the 415 chain locally, you can buy BMX stunt chain (probably even better than 415 heavy) from any good bicycle shop - save the waiting time and save on the freight costs from Bellinghen to you.



### **STEP 13**

Install exhaust pipe. If you need to bend the pipe so it will not hit the frame or bolts, clamp the pipe into wood blocks and bend. Don't bend it too much because you don't want to break it. Don't bend the exhaust whilst mounted to engine. If you do, you will not bend the exhaust, you will break the motor! Exhaust pipe is very strong - much stronger than the 2 mounting studs on the motor.



#### **STEP 14**

Mount the carburetor. Check the other screws including the brass fuel inlet screw for tightness. Typically they need some slight turning. Once the carburetor is on and tight, you are ready to connect the tank line to the carburetor. Tip ...get an inline fuel filter for \$5 from the ZBox spare parts page. Even though the fuel petcock has a screen filter, it is porous and allows sediment through. A high quality ZBox inline fuel filter with paper element is the way to go to keep fine particulate out of the carburetor and the engine.

The installation is now completed. Mix your oil with the petrol before adding to tank. Fuel up the bike and fire it up. It is recommended to pedal the bike up to about walking pace before releasing the clutch lever. Enjoy! Don't get too excited... this is a new motor and you need to take it easy for the first 500 kilometers in accordance with the run-in procedure. You have to run it in but that is fun too...Enjoy!



**NOTE:** During run in, keep drive chain snug. During run in keep the mix ratio at 16:1 for 500 kilometers and keep your speed down to a maximum of 20kph and do not run your motor for longer than 30 minute periods.

After running in you can allow the chain a little slack. Also, keep mix ratio at 20:1 and use a high quality motorbike or lawnmower two stroke oil.

**FAILURE TO FOLLOW THIS RUN-IN PROCEDURE WILL CAUSE YOUR ENGINE TO SIEZE UP AND WILL VOID ANY WARRANTY CLAIM.**

## **WARNING**

Do not operate engine without kill switch installed. It could result in personal injury if an emergency stop is required. The only other way of stopping the engine is by releasing the clutch lever with bike brakes on and engine at slowest idle - this is not recommended.

### **MAINTENANCE ROUTINE**

#### **1. Clutch:**

- a) Remove right side cover from engine.
- b) Place a small dab of grease at gear mesh area.
- c) Replace cover.

#### **2. Carburetor**

Depending on 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. Be sure element is completely dry before re-assembly.

#### **3. Spark Plug**

Remove spark plug and inspect for excess carbon build up. Clean, re-gap to .6mm - .7mm if necessary. Check plug after every 20 hours of operation. A suitable replacement plug an NGK B6HS; NGK B5HS or BOSCH WR 7AC or Champion equivalent is okay to use. The NGK R7-HS is also recommended for better performance and smoother idling.

#### **4. Exhaust system**

After 20 hours of operation check exhaust pipe for excessive oil and carbon build-up. Be sure to use supplied support strap to secure exhaust muffler to a solid anchor point on bike frame or engine.

- a) Remove exhaust pipe cap by loosening the retaining screw.

- b) Spray degreaser into baffle rinse and dry.
- c) Re-assemble

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

## 5. Chain

Every time 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 15mm.
- d) Low speed "chain rattle" can be eliminated with the application of graphite grease to chain.

## 6. Head Bolts

Tighten all fasteners after each five hours of operation. It's most important to check cylinder head bolts: tighten in a X pattern to 12 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 ride, vibration can cause them to loosen and blow a head gasket. Caution: Do not over torque or head bolts may break off. Use of a little 'Holdtite' or 'Locktite' is recommended to keep head nuts secured against vibration.

## 7. Right side gears

Remove cover plate and apply a 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 if required will help reduce gear wear and keep gear train quiet.

## 8. Sealing the magneto coil from water

The magneto coil will fuse if it gets wet. Unfortunately with the design of the engine, the wire outlet hole faces forward into the weather and water can get into the magneto if the outlet hole is not properly sealed. ZBox engines will come fitted with a rubber grummet that will partially exclude water but you are strongly advised to completely seal the hole with silicone jelly or a similar product. Sealant and 'Holdtite' is available from the ZBox spare parts page. Regularly check cover plates screws are tight. See image below:



### **General Information**

Obey all traffic regulations. Always wear an approved helmet whilst 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 thoroughfare or pathway whilst the engine is operating. Never operate your motorized bicycle in an unsafe manner. **Check local and state laws before riding on streets.**

**WARNING! ALWAYS wear a helmet whilst riding.**

### **Screw Tool**



The screw tool is included in the ZBox kit to remove the small sprocket and clutch gear if required.

## Motorized bicycle starting and operating instructions

### 1. **IMPORTANT: PLEASE READ THIS PETROL AND OIL MIXTURE RATIO**

The engine is a 2 stroke design, therefore a petrol/oil mixture is necessary. During the first 500km run-in period, the ratio for engine is 16 parts petrol to 1 part high-grade 2 stroke motorcycle oil (65ml Penrite 2 stroke motor oil to 1 litre of 91 octane unleaded petrol). After the run-in period, the ratio is increased to 20 parts petrol to 1 part oil (50ml Penrite 2 stroke motor oil to 1 litre of 91 octane unleaded petrol).

**Be sure to mix fuel and oil before adding to tank - don't add separately.**

Do not exceed 20km/h during run-in period. Speed may be increased to 35km/h after the first 500km.

**Use only high grade 2 stroke motorcycle oil to ensure proper engine lubrication.**

**WARNING Remember safety first:** Wipe up any spilt fuel. NEVER refuel a hot engine or smoke whilst refueling. This could result in fire and personal injury. Always move your motorised bike at least 3 metres from any refueling area before attempting to start it. Never leave the tank fuel cap off after refueling as rain water could contaminate the fuel and cause engine failure.

1. Open the fuel valve. Small lever pointed down with fuel line is in the open position.
2. Depress the small round cap plunger (tickle button), to prime carburetor. One or two times is enough.
3. Lift choke lever to the upward position. This is the small lever on the right side of the carburetor. 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.
4. Pull the handlebar clutch lever inward, to disengage the engine from the rear wheel.
5. Pedal up to pedestrian walking speed (down hill if possible for first start).
6. Let out the clutch lever all the way out while continuing to pedal. The result is a direct engine hook up with the rear wheel via chain and sprocket and the engine will now start spinning. Pedal until motor starts. Accelerate slowly at first.
7. Twist throttle to increase speed, reverse twist throttle to decrease speed. To stop, disengage clutch and apply brakes. To accelerate, pedal and release clutch whilst opening throttle.
8. Adjust choke to the smoothest engine running position.
9. **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 button, stop and adjust engine rpm.

10. If the rpm needs adjusting, turn the idle adjust screw (top of carburetor) in or out slowly to obtain the proper idle speed of about 1400 rpm +/- 100 rpm. To correctly run the engine in, do not exceed 20kph or 30 minutes of continual running for the first 500klms during engine run in. **Engine will develop more power after run in.**
11. To stop the engine, push kill switch and turn off fuel valve at tank. Turning off the fuel will prevent fuel from being drained from tank.  
**Warning:** Never leave the tank gas valve in "open" position when engine is not running or the bike is in storage.
12. After or before each ride check all mounting fasteners, including head bolts, axle and brakes. Using 'Holdtite' or 'Loctite' during initial installation will stop screws and nuts vibrating loose during running.

**Warning:** Engine lock up or piston seizure will occur due to improper petrol/oil mixture. This is the responsibility of the owner/operator to make sure the petrol and oil is mixed correctly and the run-in procedure is followed correctly.