Diagram 1
Section of cylinder

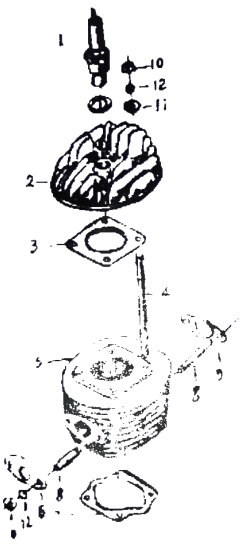


Diagram 3
Section of clutch and controls of clutch

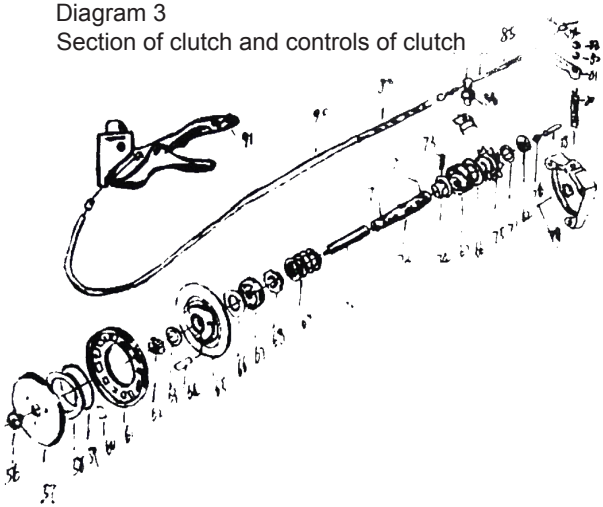
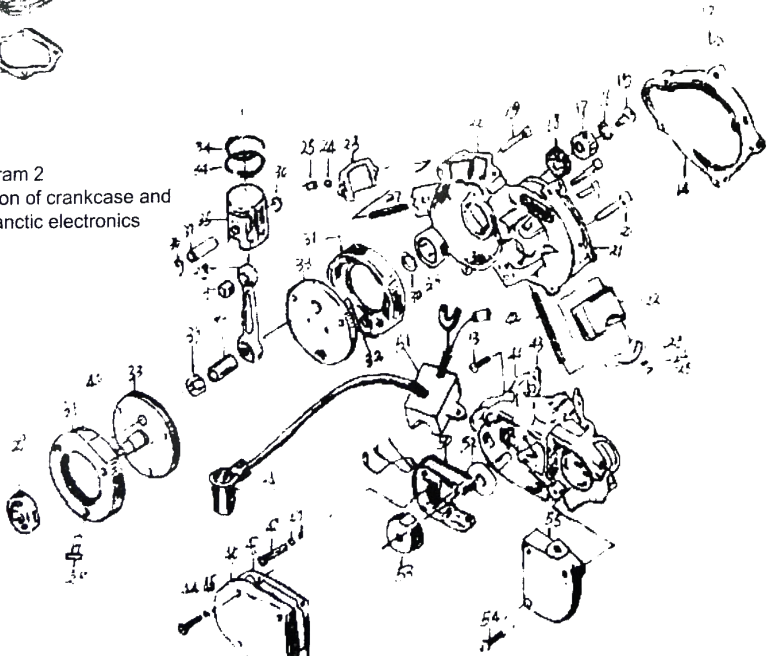


Diagram 2
Section of crankcase and
maganctic electronics

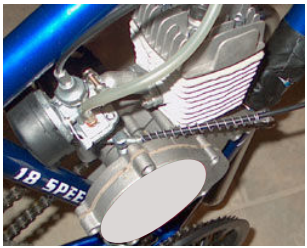


Fitting instructions for ZM MOTORS 48CC and 80CC bicycle engines

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

Basic mechanical skills are needed to properly install this engine kit.Some buyers may be abie to compiete this jop within 2 hours while others may take 6 to 10 hours. It is not important on how long the jop takes,but the quality that is needer when doing the jop. The easiest installation is performed on the standard V Frame 26" bike with the 25mm round tube frame. Other custom bikes are able to be used as choppers, tandems and mountain bikes but customization is very important in those bikes. Inthese instructions we will stick to working on the standard V Frame bike. V Frame bikes are the easiets to use and the bicycle engine kits follow those standards

When installing motorized bicycle engines it is always a good idea to alwaysscrew on all nuts and use all bolts.All nuts must be screwed on tight incase of vibration than may cause the gaskets to blow. Remember tightening all screws may save your life.



INSTALLING REAR SPROCKET

STEP 1

There are two rear sprocket rubber packers. Cut one of them and only one. Cut only 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

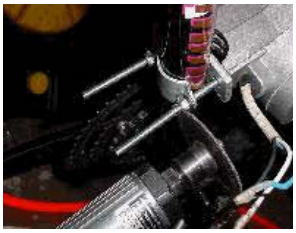
Here is how it looks when completed. Nice, tight and true.

STEP 5

MOUNTING ENGINE TO FRAME

Mount the engine into the frame. This is the front motor mount. Some bikes have a largediameter lower bar and some need clearance for the air box intake so you need to usethe parts provided in the kit. Use spacer provided with the kit. This spacer normallywould 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. Thenyou can use the steel motor mount clamp that came with the kit and not have to drill a holein your frame. Then cut the excess off. My bike had an ovoid shaped lower bar about50mm across.



STEP 5 Compiete

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

FITTING CONTROLS

STEP 6

The new style throttle is fitted to the r/h side of the handle bars - before you slip thethrottle onto bars you will need to drill a 5mm hole in the handle bar 125mm from theend to locate the plastic throttle location tit. Put a drop of machine oil into the cablesheath whilst you have it apart. Care should be taken with the cable location grove - ifyou are too rough with it, you will break it. Be gentle when installing the throttle. Thenew style throttle has a kill switch incorporated into it. Wire one kill switch wire to theblack wire from engine and the other kill switch wire to the blue wire from the engine.Pressing kill switch will cut power to the spark plug and stop engine running.

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. Also wire in kill switch to black and blue wires as previously explained. The white wire is generator and has a max output of .5A 7.5V. Anything that draws more current connected to the white wire will kill the motor. You can use the white wire to run a 6 voltlamp. It is very important to ensure the cover plate on the magneto remains tightly sealed (use 'Locktite' on screws). If water is allowed to get into the magneto chamber, it will cause the magneto to fuse out.

Testing resistance on Magneto coil should read:
blue to black = 323ohms; 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.

STEP10

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.

STEP11

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

STEP12

Cut chain to length and using master link put chain back together. Do not cut chain too short! Install Idler pulley. Make sure you grease the plastic wheel metal shaft. Do not over tighten chain.

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.

Install chain guard. Use some tin snips to cut cover at the rear if needed. Use a ood zip tie at therear and the extra long bolt for the counter shaft cover will hold the front.With the heavyweight chain, it is a good idea to knock the points off the top of the small 9 tooth drive sprocket to allow free travel of the chain over the sprocket teeth. You can do this with a file or grinder when cover plate is removed.

STEP13

Install exhaust pipe. If you need to bend the pipe some so it will not hitthe frame or bolts, clamp the pipe into wood blocks and bend. Do notbend exhaust mounted to engine. If you do, you will not bend the exhaust,you will break the motor! Exhaust pipe is very strong - much stronger thanthe 2 mounting studs on the motor.

STEP14

Assemble the needle,sping,slide and cable in the carburetor-insert the slide in the carburetor housing,rotaing it until itmeets its groove and fully drops in place. Hookup the throttle twist grip-the carburetor slide should raise almost an inch while the grip twists abouts a halt a turn.you can take the slack in your throttle cable off by taping the end gap and applying heat shrink tubing to firmup the hookup.Install the carburetor on the intake manifold.

Once thecarburetor is on and tight, you are ready to connect the tank line to thecarburetor. Tip...Get and inline fuel filter. Even though the fuel petcock has a screen filter, it is porous and allows sediment through. A high quality inline fuel filter with paper element is a super way to go and to keep fine particulate out of the carburetor and the engine running fantastic and like new. Well the install is done. Mix your oil with the petrol before adding totank. Fuel up the bike and go baby go! Enjoy! Ah!..do not get too excited...This is a new motor and you need to take it easy for thefirst 500 kilometers in accordance with the run-in procedure. Ohwell - the price of owning a new engine. You have to run it in but that isfun 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 amaximum of 20kph and do not run your motor for longer than 30 minute periods.

After run in you can allow the chain a little slack. Also, keep mix ratio at20:1 and use a **high quality synthetic Motorbike .**

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 dusty riding conditions, clean air filter every 5to 20 hours of operation by removing the filter cover toaccess the screen and element. Wash element with adegreasing 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 plugafter every 20 hours of operation. A suitable replacementplug is NGK BP-6L if you can find it. Otherwise, go for the NGK B-6L. 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 onbike frame or engine.
a) Remove exhaust pipe cap by loosening the retainingscrew.
b) Pull cap and baffle out of pipe.
c) Clean with degreaser, rinse and dry.
d) 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 '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. Some 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. 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 kit to remove the small sprocket and clutch gear if required.

Motorized bicycle starting and operating instructions

PETROL AND OIL MIXTURE RATIO

The engine is a 2 stroke design, therefore a petrol/oil mixture is necessary. During the first 500km break-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 break-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 break-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 (down hill if possible for first start).
6. Let out the clutch lever all the way out and 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 notched catch, stop and adjust engine rpm.
10. 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: Never leave the tank gas valve in “open” position” when engine is not running or the bike is in storage.
11. After or before each ride check all mounting fasteners, including head bolts, axle and brakes.
12. Warning: Engine lock up or piston seizure due to improper petrol/oil mixture will occur. This is the responsibility of the owner/operator to make sure the petrol and oil is mixed correctly.