

## Prerequisites:

- Order your gaskets average about \$25.00 bucks X 2 so \$50.00 4NK-11193-00-00
- Obtain a shim kit (Should have several 265 and 270s) (Some dealers will exchange)
- Obtain a Valve Bucket Tool *YM-33961 \$75.00*



- Coolant (Good time to change)
- High Temp RTV
- Spark Plugs (easy time to change them out)
- Carb Cleaner (Good time to do any carb maintenance like float levels)
- Jack (recommended but not required) bike needs to be level, I used a block of wood under the kickstands and weights on the floorboards to keep it from tipping over.
- Tools:
  - Feeler gauges metric
  - Torque wrench that goes down to 7.2 ft lbs (10 Nm or 86 in lbs) ¼ in drive works great
  - Magnetic retrieving tool, tweezers or hemostats, and a good quality small straight screwdriver (Ones with magnets on the handle work real well. Required to remove the shims.
  - Small LED Flashlight.
  - 4 & 5 MM hex head wrenches
  - #1,2 & 3 Phillips screwdrivers



- Shop Manual (recommended) pages 3-9 through 3-13.

## Getting Started:

1. Remove the Seat
  1. Remove the two 10 mm head nuts on each side under the front of the seat.



2. Remove the tank
  1. Remove the two 4mm hex head screws up front (you may have snap on covers over them just pull those off)



2. Remove the bolt under the seat



3. remove the ignition switch cover
4. remove the vent line
5. unhook the fuel sender line
3. Remove Lower Cowlings
4. Air Filter Housings
5. Detach Rear back fluid reservoir from frame



6. Remove the "dog bones" connecting the front cylinder heads to the frame.



7. Remove the air intake tract, including the rubber tubes where the air filters attach, the top air plenums, and the rubber T between the air filters (it is held on by one 10mm bolt on the right side of the frame).





8. Remove the Top Air Plenums
  1. Remove the metal straps on top (four screws each), and the two screws holding the crank case vent hose in the middle



2. Pull the hoses and wire bundles off to the side.





3. After the clamps on top of each carb and the front clamp are loose, each plenum will just pull straight up. (note that the inside front screw on each plenum is longer than the other three take care in reinstalling they will strip if too much torque is applied !



When you pull the crankcase breather connection loose from between the two air plenums, be careful of the little foam rings, most of them are stretched and falling apart - unfortunately they don't seem to be available in the parts breakdown.





When you lift off each air plenum, there is a vent hose connected on the rear that will just pop off (watch out for the little wire spring clip - they aren't really necessary, but you don't want to have one pop off and get stuck in a carb or something).



9. Remove all four plugs (need to do this to allow engine to turn the engine over while checking the valves).

10. Drain the coolant - if not changing it, you will still need to drain a quart or so to allow the removal of the water hose from the rear head.

**CAUTION!** The 12mm drain plug on the bottom left of the radiator is just plastic (as is the radiator), so when putting the plug back in, **DO NOT OVER TIGHTEN!!!!** The correct tightness is about what you can put on a clean, dry 3/8" socket extension with your bare hand.

11. Remove the carb assembly.
  1. Disconnect the fuel line behind the right rear carb



2. Open the two clips on top of the carbs to release the fuel line that goes to the tank.
3. Disconnect the two overflow hoses that connect on top between the carbs and run forward to the front of the air filters. You can remove these but note their routing and pay attention to the plastic clip that holds them together between the carbs.
4. Remove the water line from the right side held on by two small screws.



5. Loosen the hose clamp beneath each carb use correct size screwdriver and be careful note to strip out the heads
6. Disconnects the two electric plugs for the wires connected near the left front carb. You will find both of these plugs right up next to the frame under the large main wire bundle.
  1. The white two-wire plug is for the carb heaters
  2. The black triangular three-wire plug is the throttle position sensor.



12. With the hose clamps below all four carbs loose, pull straight up on the assembly on each side to get them loose from the intake manifolds (this may require some force).

13. With the carb assembly loose it slides straight out the left side until you can get to the throttle cables.
14. Disconnect the throttle cables loosen the long nut on each cable to allow it to slip off the bracket – if you do not move the small nut, the cables adjustment will not change. **(make sure you note which cable went where). (you may want to tape the nuts to make sure they do not move)**



15. Pull carb assy the rest of the way out and cover the intake holes so you do not drop anything in.
16. Remove the chrome covers on the cylinder heads.



17. Remove the plastic wire tray under the frame in front of the battery cover by removing the 10mm bolt on the left side and a #2 Phillips head screw under all those hoses in front of the battery.





18. Pull the disconnected vent hoses out the back for more clearance, make sure to note routing. (recommend using a tie wrap around the wires and frame to keep them out of the way)
19. Remove the rubber hose for the water line to the rear cylinder head (I used needle nose vice gripes to get to the clamp).
20. Remove the two plugs/covers in the center of the left crankcase cover to turn the engine. The two #3 Philips-head screws are normally REAL tight, so it is very **important you use the correct size screwdriver**, with the screws out, just use a very small screwdriver to work the cover back and forth on the O-ring to get it to pop off. There is a thin metal plate that will fall out as soon as the cover comes loose - it just goes back in with the ridge facing the crank, and you usually will not need to replace the O-rings on the covers.



#### 21. Remove the valve covers

1. Remove the four 5mm flat hex-head bolts on each
2. Remove the valve covers by pulling up the corner of the gasket and inserting a small screwdriver to catch the edge of the valve cover to pry it up.
3. Raise the rear cover high as it will go and to the rear some and it should slide out with a little effort you may need to rotate it a little also to clear the cam chain (not much clearance in the rear)
4. Raise the front cover and take it out the right side to clear the water hose you left in place.



**VALVE CLEARANCE MEASUREMENT:**

1. Turn the engine counterclockwise until you see the valves on #1 cylinder (left rear) all closed, then watch for the timing mark on the generator rotor through the observation hole (the small cover to the left of the big cover) to align with the mark on the crankcase cover (I used a flashlight to help me see the marks). It is not necessary for it to be exactly perfect to measure the valves.
2. Check the clearance on both intake and both exhaust valves for #1. Write down each measurement (I made a chart to help me out).
  - a. Checking Clearance



- i. The cam lobes should be positioned like the picture below:



- ii. Insert your Feller Gauge between the shim and the cam lobe as pictured, there should be a slight resistance when you pull it out when you have the correct size:





3. Turn the crank 180 degrees, cylinder #3 (right rear) will be at TDC and ready to check (just put the socket on the crankshaft with the handle pointing to the rear and turn it counterclockwise until the handle points forward - can't get much easier than that!) write down the measurements.
4. Turn the crank 180 degrees again, then start watching for a second timing mark to line up on the generator rotor 70 degrees later (a little less than 1/4 of a turn), now #2 is at TDC and ready to check. write down the measurements.
5. Turn the crank 180 degrees one more time and #4 will be at TDC and ready to check. write down the measurements.
6. Turn the crank just 110 degrees puts #1 back at TDC to start over.



### **CHANGING THE VALVE CLEARANCE:**

Note: You will find a second person to help turn the engine VERY helpful here, especially when working on #3 and #4!

Adjusting the clearance is down by removing the existing shim and replacing it with one of a more appropriate thickness. Most changes will be to a thinner shim; however you cannot determine what size you need until you remove the existing shim.

1. Turn the crank till the cam lobes are pointing away from the side you plan on inserting the tool
2. Turn the shim buckets with your fingers till the notch is aligned so that you can get to it with the small screwdriver.



3. Getting the tappet adjusting tool inserted the first time can be a little tricky. It can be inserted from either side of the cam, depending on which side you want to pull the shim.



4. Insert the tool try to rotate the short end under the cam to depress the buckets, once you get it as far as your fingers will take it slowly turn the crank in the proper direction to let the cam finish turning the tool into place (keeping some pressure on

the long arm of the tool will help it move). Ensure the long arm touches the side of the head in order to give enough clearance to remove the shim. **Do not turn the cam too far you may cause damage to the engine or break the tool.**



5. Pry up on the shim using the little screwdriver there is oil under it so it has some suction to it.

6. Pull the shim out using tweezers or a magnet to pull it out. (a alignment screwdriver with a magnet tip on the handle works great)
7. Record the number on the bottom (**number side should always be down**). Replacement shims are only available in .05mm increments however OEM shims can end in numbers other than 0 and 5 if they are in the shim kit they came out of Someone else's bike.
8. Determine what shim to put back in by taking the measurement you wrote down for clearance and the shim number you recorded and reference the chart in the service manual to determine what the replacement shim will be (I adjusted to the loose side of the spec) **Remember there is an intake and an exhaust chart.**
9. Install new shims by the same method you used to take out the original shim. (**Ensure shims are well seated**) Turn the engine over half a dozen times and repeat the valve clearance measurements twice on the shims you replaced to ensure that you have the correct clearance (**remember there was oil under the shims**)

### Reassembly:

1. **Ensure the tool is not in the engine or anything else.**
2. Install valve cover gaskets noting the squiggly areas on the gasket align with the squiggly area on the cylinders. (they only go one way)



3. I recommend putting a little RTV high temp sealant on the large bumps at either end of the gaskets.
4. It is easier to lay the gaskets on the cylinders and fit the covers over them once you have them on due to clearance issues.
5. Check to ensure the gasket is firmly and correctly in place by shining a bright flashlight around the whole thing.

6. Torque the cover bolts to you will need a small torque wrench and a 5mm hex socket I used a ¼ inch drive and a wobble end socket and it worked well.
7. Install chrome covers using a 4mm hex wrench or socket they are not all the same so if you did not keep them in order the picture shows you how they go back.



8. Install four spark plugs
9. Connect the rubber hose for the water line to the rear cylinder head
10. Install the front "T" air intake tube makes sure the lug sticking on the front is in the rubber grommet in the frame.
11. Install the rubber Y that connects the air plenums on the "T" the hose clamp screw should be on the left side of the bike, with the head facing up.
12. Make sure the hose clamps are properly positioned on the top of the intake manifolds.
13. Slide the carbs in from the left side until there is just enough room to reinstall the throttle cables
14. Install throttle cables
15. Center carbs on the manifolds
16. Push down hard to pop the carbs back in place. (**Do not push on any plastic parts**)
17. Connect the water line back to the right side of the carbs.
18. Re-route all the fuel lines and vent hoses appropriately
19. Connect the two electric plugs for the wires connected near the left front carb.
  - i. The white two-wire plug is for the carb heaters
  - ii. The black triangular three-wire plug is the throttle position sensor.
20. Reinstall air plenums
  - a. Make sure the clamps are plenty loose and rock the plenum a bit when putting it on. If the rubber is not buckled in there, the plenum will fit fully down on the carbs and not spring back up at all. Unlike the lower hose clamps, those on top of the carbs do not have a metal collar to prevent them

from being over tightened, so just make sure they are properly set in the grooves on the plenum and snug them up pretty good

- b. Reinstall vent hoses
  - c. Install crankcase breather connection be careful of the foam rings
  - d. Install hoses and wire bundles back into grooves
  - e. Install the metal straps on top (four screws each), and the two screws holding the crank case vent hose in the middle **(Do not over torque, they will strip easy) (Remember the inside front screw on each plenum is longer)**
21. Install the left and right tubes to the air filter boxes
  22. Attach Rear back fluid reservoir
  23. Install air filter boxes
  24. Refill cooling system
  25. Install Lowers
  26. Install Gas Tank
  27. Attach fuel line
  28. Attach vent hose
  29. Connect fuel sender wire
  30. Install ignition switch cover
  31. Install Seat