

## **V\*Star 1100 Cam Instillation Process (Check List Format)**

### **Tools needed:**

3/8 Ratchet  
3/8 Torque wrench capable of going down to 7.2 ft-lbs  
10mm, 12, mm, 17mm, 22mm sockets, 5mm Allen socket  
Feeler gauges including .07, .08, .10, .12, .15mm feelers  
Flat Head screw driver  
Set of Metric Allen wrenches  
Vise grips  
Carb synch tool should be used as well for final tuning after carb re-jetting  
Zip ties if needed  
Repair Manual (Clymer's {best} or Yamaha Shop Manual)

### **Supplies & Parts needed:**

#### **Assembly Lube is a must!! (Should come with new cams - can be bought at any Auto Parts Store)**

Lithium soap grease (for O-ring lube)  
New cams  
Gaskets: (2) Intake valve cover O-rings, (2) Exhaust valve cover O-rings, (2) Timing chain tensioner gasket  
Main jets for your application  
Shims for the carb needles per your application

**Read these instructions all the way through, referring to your shop manual and its diagrams to familiarize yourself with the entire process. As you begin the process, check off each step as you complete it – to help ensure no missed actions.**

### **Before You Start:**

\_\_\_ 0 Change your oil to Dino (non-synthetic) oil – required for the break-in period (note: not necessary to change the filter – just the oil) See Break-In section at the end. DO THIS BEFORE YOU START CAM INSTALL!

### **Getting Started:**

- \_\_\_ 1 Start by making sure the key is off, take it out of the ignition, shut off the gas and remove the fuel line from the tank, careful of fuel still in the line. Hold a rag on it till it drains.
- \_\_\_ 2 Remove the rear and front seat
- \_\_\_ 3 Unplug lead going to tank. This is located under the ignition unit and can be accessed by removing a few plastic rivets, and lifting the ignition unit up. You will see a large white connector separate it by pushing the release tab and gently wiggle it apart.
- \_\_\_ 4 Now you can remove the tank (two bolts) Lift it off carefully and place in a safe place away from your work area. With the tank out of the way remove each (4) plasti-chrome cylinder beauty cover and each spark plug . Place in safe place.
- \_\_\_ 5 Remove the air box if it is still in place and put aside. You will want to remove your pods to provide added access, if pods are installed (and they will have to come off to allow re-jetting at the end of the process, as required by the new cams.
- \_\_\_ 6 Remove all four (2intake/2exhaust) valve rocker covers note which goes where and place aside. These are located above each intake and exhaust port. Be careful not to drop anything into open rocker arm area.
- \_\_\_ 7 Remove each side cover on the cylinder heads and place in a safe place. This will open up to the cam/cam gear/timing chain. Refer to repair manual for pics
- \_\_\_ 8. On the left side crankcase cover remove the two round plugs. These can be easily removed by using a large flat head screw driver, take care not to bugger them up.
- \_\_\_ 9 Now it is time to loosen each bolt which holds the cam gear/chain on the cam itself. You will need a 17mm socket for the cam gear bolt, and a 22mm long socket with extension to go on the crankshaft nut.
- \_\_\_ 10 The 17mm goes on the cam gear bolt and the 22mm socket goes in thru the larger of the two holes on the left side crankcase cover and goes on the crankshaft nut. Note while turning the motor, The crankshaft nut should be turned clockwise (the motor spins backwards or clock wise looking at it form the left side). OK now use the ratchet on the crankshaft to keep it from turning and loosen the cam gear bolt (do both front and rear). Leave finger tight.

## We will do the Rear Cylinder Cam 1<sup>st</sup>

\_\_\_ 11 **Line up the rear timing mark (T I)** on the flywheel with the slot thru the smaller hole on the left side crankcase cover. Simply turn the motor clockwise until the mark comes up in the timing hole. If the motor is at TDC you will see the cam gear dot is on or close to the head pointer. If it is not on or close, and is 180° away from the head pointer, then spin the motor one full turn and come up on the (T I) timing mark again. Then the cam gear dot/head pointer should be lined up. Make a mental note if the cam gear dot is off the pointer a little, most are. Some have been found to be a ½ tooth off. Always set the lower (T I) timing mark dead on and note the cam dot position in relation to the head pointer. You want to put the new cam back in the same way the old cam came out. It is important that the crankshaft does not move after this.

**Very important Place a small piece of a clean rag into the cam chain slot to prevent anything from being dropped into the motor.**

\_\_\_ 12a Remove the chain tensioner from both cylinders (located on the left rear of the rear cylinder and the right rear of the front cylinder) . Loosen the little bolt on the end of the tensioner before removing. Note the up arrow on the tensioner. The place you bought your cams from should have included new gaskets for these. If they don't come off clean and you don't have new gaskets then use Permatex gasket maker temporarily.

\_\_\_ 12b. Take a piece of coat hanger and make a hook to go around the cam chain. Make it about 1 foot long. This will prevent the chain from dropping in the motor. **Hang the chain from someplace on the upper frame**

## Back to the cams

\_\_\_ 13 Remove the bolt from the cam gear and remove the gear/chain. **Watch out for the set pin in the cam/ cam gear (you may want to use a magnet to remove first, to avoid losing it** (the set pin will be inline with the cam gear dot and you will most likely be using these in the new cams if they didn't come with new pins), and place off to the side and let the chain hang from the hook you made. **\*\*Use a flathead screw driver and wiggle the gear off the cam. Again it is critical that the crankshaft doesn't get moved!!!!!! If it does, then simply move it back the opposite way it moved to the timing mark. Turning the motor backwards a little wont hurt it. Do not spin the motor completely around, always make note of how much it moved and in what direction, and always move the motor back the way it came from. You need to be careful with this.**

\_\_\_ 14 Remove the cam retainer bolt and retainer plate and place off to the side.

\_\_\_ 15 Now take the cam gear bolt and thread it back into the cam without the gear.

\_\_\_ 16 Use a pair of Vise Grips and grab the bolt. Now give it a couple of pulls to start the cam and main cam bushing to slide out. It might be a little tight at 1<sup>st</sup> but it will come out very easy. You may have to loosen the rocker arm adjuster a little.

\_\_\_ 17 **This is the #1 cam** make sure you put the right cam in each head, they are different.

**Lube the new cam (Be sure to use ample assembly lube on the new cams) and slide the new cam in the same way the old cam came out.** If you look on the end of the cam where the gear goes on you will see there is a small set pin hole. Insert the pin in the new cam (careful not to drop the pin in the motor).

\*\*\*This lines up with the dot in the cam gear and goes toward the head pointer. It might be easier to put the cam bushing on after you slide the cam in and do the initial lining up.

Torque the cam retainer bolt and plate (14lbs)(Cam gear bolt is 40lbs)(all other bolts on the engine case are 7.2 lbs)

\_\_\_ 18 Now go backwards in the instructions and reinstall the cam gear and timing chain. You may have to take a couple of shots getting the gear in the cam chain to line up with the pointer the way it came out. It is important to push a finger thru the tensioner hole while checking the gear dot / head pointer alignment. When you get them aligned like it was before you took the old cam out you are set and can torque the cam gear bolt to 40lbs (hold the ratchet thru the crankcase hole while torquing this bolt) . Do not put the cam gear head cover on yet.

**When replacing the cam chain tensioner - it must be reset.**

You'll need to remove the little 10mm bolt from the end (remember we loosened this before taking the tensioner off the cylinder) and use a very small screw driver and turn the adjusting screw until the tensioner comes all the way back and stays. **It cannot be installed if the tension rod pops back out.** After installing the tensioner give it a little tap with the fat end of a screw driver. Make sure it releases and puts tension on the chain.

\_\_\_ 19 Now adjust the valves. Make sure the cam gear dot is on (or close to) the head pointer and the lower timing mark is still lined up. Intakes are set .10 mm feeler goes, .12mm feeler is no go. Exhaust .12mm feeler goes, .15mm no go (same goes for the front cylinder.)

Leave the side cover off until the front is done.

## Now to the Front Cylinder Cam

- \_\_\_ 20 Spin the motor 290 degrees to line up the front cylinder timing mark (I) Easiest way to do this is go slow and have some one else watch the cam gear dot on the front cylinder cam coming up on the head pointer. When it gets close you know the front (I) timing mark is about to come into the lower timing hole.  
**Please refer to the Repair Manual if you are not sure which timing mark to use. Don't use the [FI] mark for the front!!! This mark is not used. The front timing mark is the single line ( I ), the rear is the (TI).**
- \_\_\_ 21 Remove the bolt from the cam gear and remove the gear/chain. Watch out for the set pin in the cam/ cam gear (you may want to use a magnet to remove first, to avoid losing it (the set pin will be inline with the cam gear dot and you will most likely be using these in the new cams if they didn't come with new pins), and place off to the side and let the chain hang from the hook you made. \*\*Use a flathead screw driver and wiggle the gear off the cam.  
**Again it is critical that the crankshaft doesn't get moved!!!!!! If it does, then simply move it back the opposite way it moved to the timing mark. Turning the motor backwards a little wont hurt it. Do not spin the motor completely around, always make note of how much it moved and in what direction, and always move the motor back the way it came from. You need to be careful with this.**
- \_\_\_ 22 Remove the cam retainer bolt and retainer plate and place off to the side.
- \_\_\_ 23 Now take the cam gear bolt and thread it back into the cam without the gear.
- \_\_\_ 24 Use a pair of Vise Grips and grab the bolt. Now give it a couple of pulls to start the cam and main cam bushing to slide out. It might be a little tight at 1<sup>st</sup> but it will come out very easy. You may have to loosen the rocker arm adjuster a little.
- \_\_\_ 25 **This is the #2 cam** make sure you put the right cam in each head, they are different.  
**Lube the new cam (Be sure to use ample assembly lube on the new cams) and slide the new cam in the same way the old cam came out.** If you look on the end of the cam where the gear goes on you will see there is a small set pin hole. Insert the pin in the new cam (careful not to drop the pin in the motor).  
\*\*\*This lines up with the dot in the cam gear and goes toward the head pointer. It might be easier to put the cam bushing on after you slide the cam in and do the initial lining up.  
Torque the cam retainer bolt and plate (14lbs)(Cam gear bolt is 40lbs)(all other bolts on the engine case are 7.2 lbs)
- \_\_\_ 26 Now go backwards in the instructions and reinstall the cam gear and timing chain. You may have to take a couple of shots getting the gear in the cam chain to line up with the pointer the way it came out. It is important to push a finger thru the tensioner hole while checking the gear dot / head pointer alignment. When you get them aligned like it was before you took the old cam out you are set and can torque the cam gear bolt to 40lbs (hold the ratchet thru the crankcase hole while torquing this bolt) . Do not put the cam gear head cover on yet.  
**When replacing the cam chain tensioner - it must be reset.**  
You'll need to remove the little 10mm bolt from the end (remember we loosened this before taking the tensioner off the cylinder) and use a very small screw driver and turn the adjusting screw until the tensioner comes all the way back and stays. **It cannot be installed if the tension rod pops back out.** After installing the tensioner give it a little tap with the fat end of a screw driver. Make sure it releases and puts tension on the chain.
- \_\_\_ 27 Now adjust the valves. Make sure the cam gear dot is on (or close to) the head pointer and the lower timing mark is still lined up. Intakes are set .10 mm feeler goes, .12mm feeler is no go. Exhaust .12mm feeler goes, .15mm no go (same as for the rear cylinder.)

**OK you're pretty much done. You have both cams installed every thing is torqued to spec, the tensioners have been reset, and the valves have been adjusted ;**

- \_\_\_ 28 Now it is time to spin the motor with your ratchet on the crank shaft and watch each cam chain and make sure everything is spinning freely and there is no binding. If all is good put the side head covers back on along with all the other covers, and tank etc.

It is always important to double check you work. Set up on the timing marks and double check all the marks for proper alignment.

**Double check that the tensioner released. Short cuts here can lead to big headaches. Take your time and do it right the 1<sup>st</sup> time**

## **Final notes:**

### **Rejetting Carbs:**

It will be necessary to re-jet your carburetors. Please ask the Vendor you purchase your cams from for separate instructions. Mains should be increased at least 2- 3 sizes from current. Base line for pod filters is 155 mains and 2 added shims on each needle with 22.5 pilots and 2.5 turns on the PMS screws.

\*\*\*O6/07 carbs will need further work. Check for more info in the KB database  
<http://www.sloneservices.com/SilverBack/VStar1100-FAQ-05.htm#Index-Perf>

### **Cam Break In:**

Note: Oil change info at the top of the document.

- Initial running of the motor should be a fast idle of around 1500rpms for around 5 minutes.  
Obviously don't overheat the bike.
- Reset idle to normal 950-1050 rpm.
- Then out for an easy ride. Use regular oil during break in of cams – Not synthetic!
- Leave in the initial Dino oil for 600-800 miles
- Then change the oil and filter – go back to your favorite oil.
- Then change again at 3000-4000 miles – normal change interval

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This was created initially by Joe Conway, joe91898(joeconway) on the forum.  
It was edited into checklist format by SilverBack(AGBack) -06/15/07  
Editted by silverback to clarify oil change and break-in info 08/26/07