

## **REPLACEMENT CAM CHAIN & TENSIONER – CBR1000F**

*This “How To” is prepared by NagaThai for all those people who, like myself, ride a CBR1000F, have limited mechanical ability but a great desire to learn. It is not intended for those who are already competent mechanics. There are many, many pictures (by intent) so you can see “How To” rather than be told. Sometimes there are pictures of the same process from different angles so if in doubt you can see more. This will provide you with confidence. Pictures also provide part numbers for parts you can purchase. This “How To” is the follow-on to “PREPARING THE REPLACEMENT CAM CHAIN – CBR1000F”.*

< Notifications of errors, omissions & improvements gratefully accepted >

Writing in **RED** serve as **WARNINGS**.  
Writing in **BLUE** serve as **CAUTIONS**.

### **BACKGROUND**

The CBR1000F (1987-1999) has had perennial problems with a rattle developing in its cam chain and cam chain tensioner (CCT).

The 1987/8 versions were retrofitted with a kit and some later models had their CCT replaced under warranty.

My 1990 model that I purchased new had the CCT replaced under warranty at 8,000km and then I paid to have the CCT and cam chain replaced at 32,000km. Now at 105,000km I have put up with the cam chain rattle for the last 30,000km and now have done the replacement myself. It is interesting to note that there never seems to be any reported damage caused by the cam chain rattle – just its annoyance.

### **ACKNOWLEDGEMENTS**

Primary acknowledgement is to Michael Parks who did the original “How To” and special thanks to CBR Forum members who provided invaluable advice; especially, HenryM, Shadow, Sprock and Sribop. My engineering guide, mentor and friend who assisted me in the project is Mr T of CMCCV – a real gentleman.

### **THE COMPLETE JOB**

If you are going spend your money and time to do this job, you will want to do it properly and completely. For ease of understanding I have broken this into **9 STAGES**;

1. Preparing The Replacement Cam Chain – CBR1000F (See separate “How To” at <http://cbrforum.com/forum/how-tos-81/cam-chain-%96-preparing-replacement-cbr1000f-142814/>)

2. Prepare Bike For CCT & Cam Chain Replacement
3. Replace the CCT
4. *For 1987 Or 1988 Model Only – The Oil Guide*
5. Replace the Cam Chain
6. Time the Cams/Valves
7. Adjust the Valve Clearances
8. Synchronize (balance) the Carbs
9. and whilst we are there... reset the Backlash adjustment

In my opinion this job was about 8 out of 10 on difficulty for persons who have limited mechanical ability but a great desire to learn. It is definitely a job that requires two people to complete (more than 2 hands required at some stages). This took about 12 hours to do the first time (because of my errors / incorrect advice and my naivety) .... But with this "HOW TO" knowledge I believe you could now complete the job in 6 hours. Don't let that scare you away, I got through it - so can you. Of course there are several ways to get this job done; this is just how I did it.

## **CAM CHAIN AND TENSIONER REPLACEMENT**

### **Parts you will need:**

1. CHAIN, CAM (150L or more) 14401-MM5-015 ( Or DID equivalent )
2. CHAIN, CAM joining link.
3. BRACKET, TENSIONER 14500-MZ1-000
4. TENSIONER ARM PIN, HP-14531-KV0-000 14531-KV0-000 – QTY 2
5. PIN (6MM), HP-90607-MM5-000 90607-MM5-000 - QTY 2
6. SLIPPER - HP-14510-MM5-640 14510-MM5-640
7. GUIDE B, CAM CHAIN 14630-MS2-610
8. GASKET, CYL HD CVR, HP-12391-MM5-000 12391-MM5-000

### **I also recommended**

1. O-RING (7.5mmX1.5mm) 91302-HB3-004 - QTY 2

If you have a 1987 or 1988 and are unsure if it has had the CCT retrofit (CCT Kit 04102-MM5-010 ) then you will need these additional parts <See Appendix at end> :-

1. PLATE, 14542-MM5-000
2. PLATE, OIL GUIDE 14541-MM5-011

### **Cost**

As a guide, as at November 2012, all parts were about US\$320.00 total.







**DO NOT.... PRE-OIL THE TENSIONER BEFORE INSTALLING.**

There has been some advice to do this but it can cause a dampening “hydraulic” lockup requiring you to do a complete re-install later. (It cost me 6 hours of heartbreak and lost time.) So DO NOT.....

More on this later.







**TOOLS YOU WILL NEED:**

1. Torque Wrench (All torque values are included in the Appendix A at the end of this document).
2. Chain Breaker / Rivet Making Tool
3. Complete Socket Set, Various screwdrivers and then Bull and Long nose pliers.
4. 2 Vice grip or clamping style tools
5. Very good lighting and small spot torch.

I recommend you do this job with the bike on a lift. It will save your back from bending over and it's easier to see the timing marks when you can see them at eye level.



**CONSUMABLES YOU WILL NEED:**

1. Loctite 567
2. Gasket cement
3. Grease
4. Thread locking agent eg Loctite 262
5. Rags
6. Beer



**STAGE 2 -PREPARE BIKE FOR CCT & CAM CHAIN REPLACEMENT**

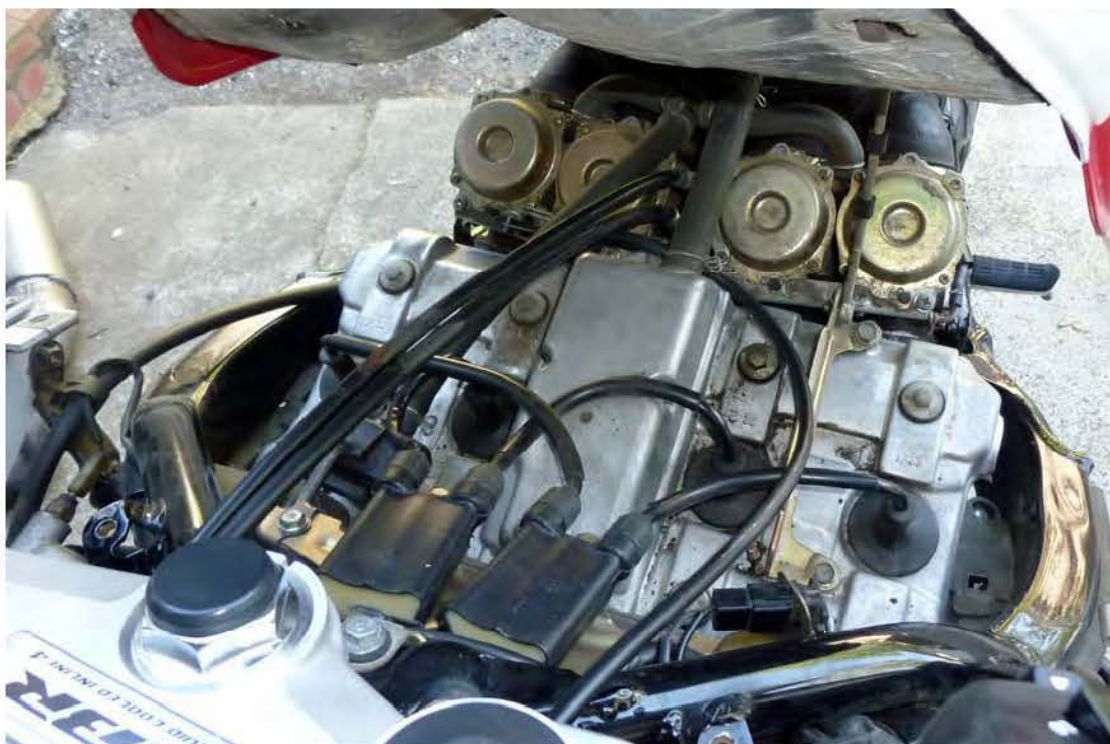
Remove bodywork and place on bike lift.











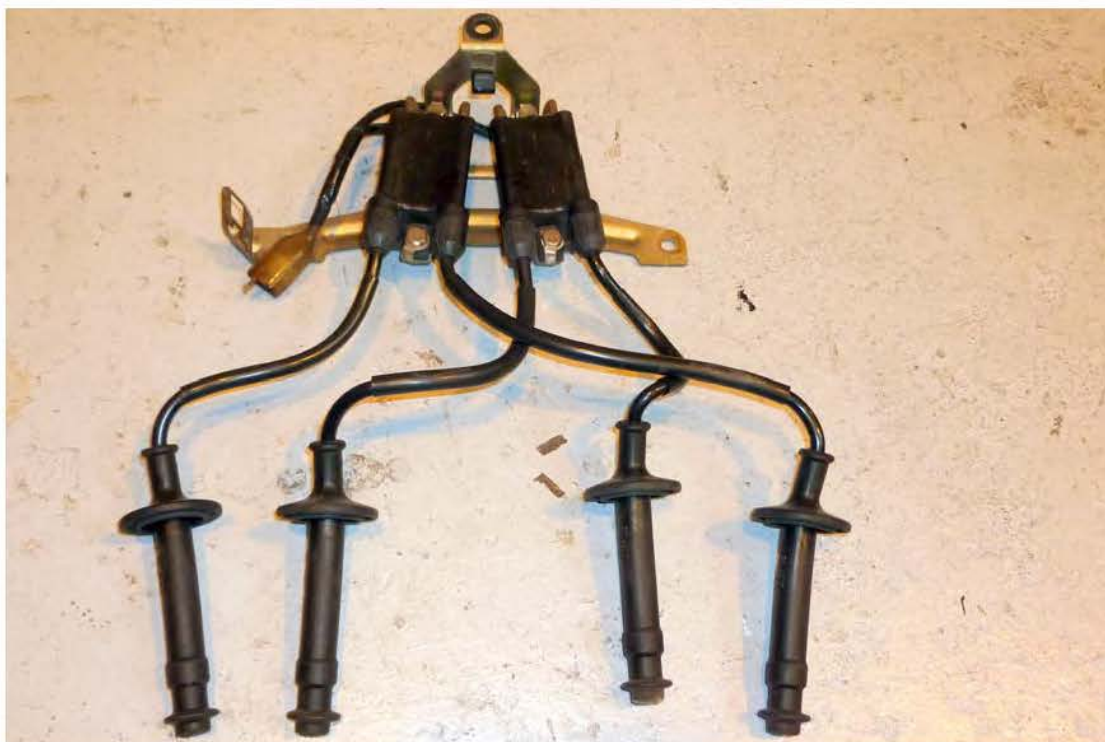






Remove the gas tank, breather tubes, rubber air deflector & coils / plug wires from the bike.





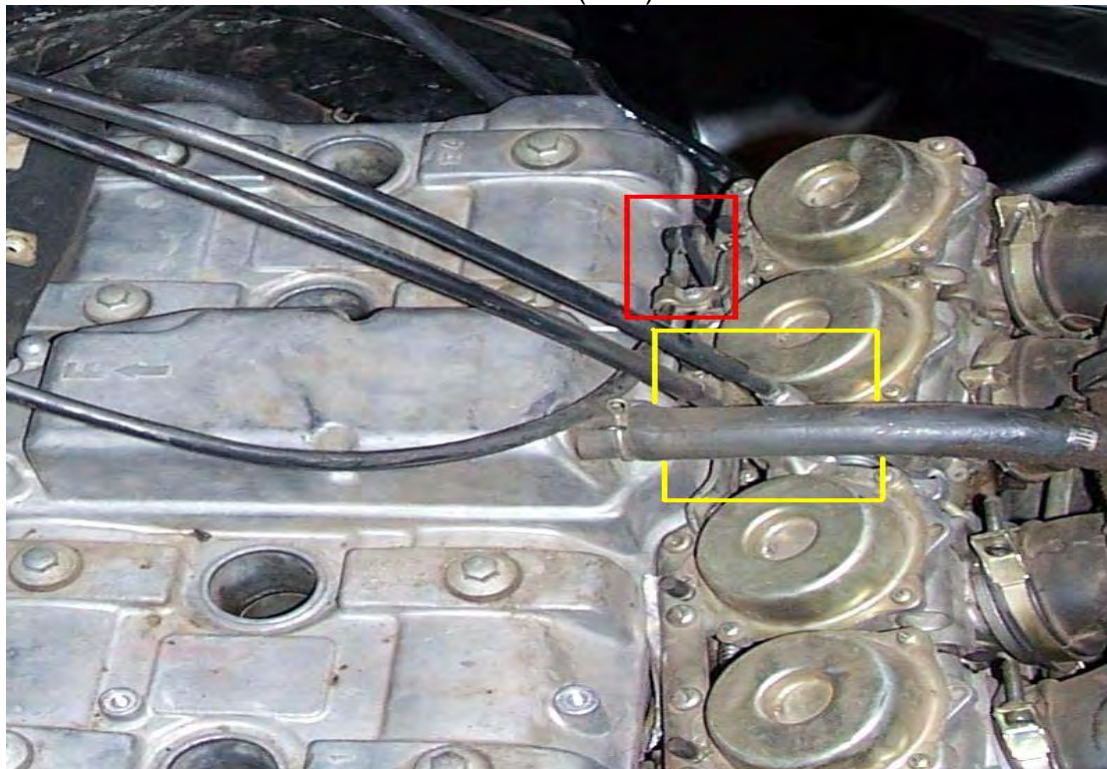


Remove the Spark Plugs (Red), Valve Cover Bolts (Green), and Crankcase Breather Tube (Yellow)

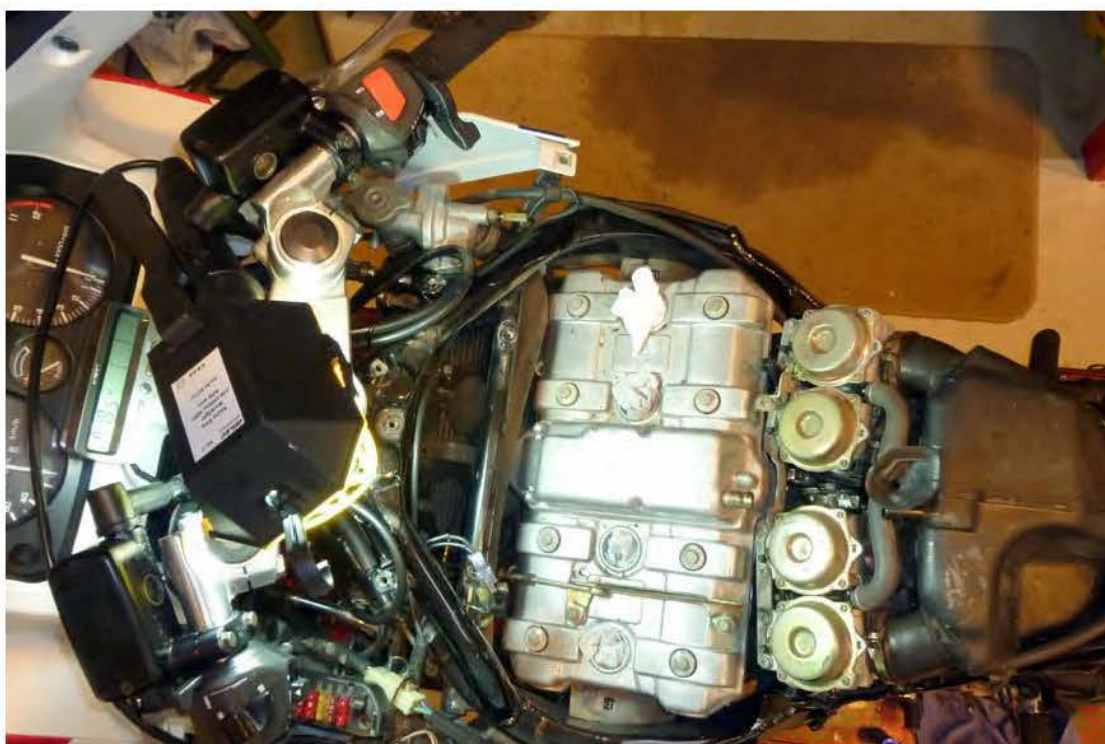
Use caution removing the valve cover bolts – loosen each a little at a time.



Remove the Throttle Cables (Yellow) including their holder attached by 2 screws to the carb #2 and Choke Cable (Red).







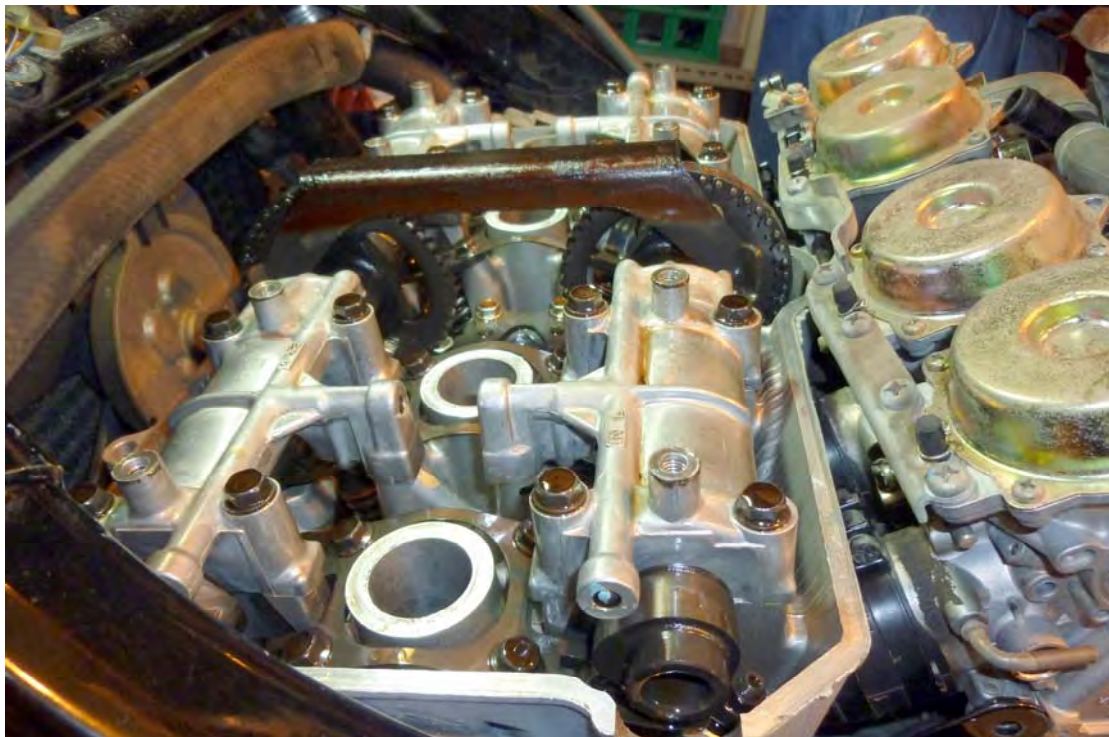
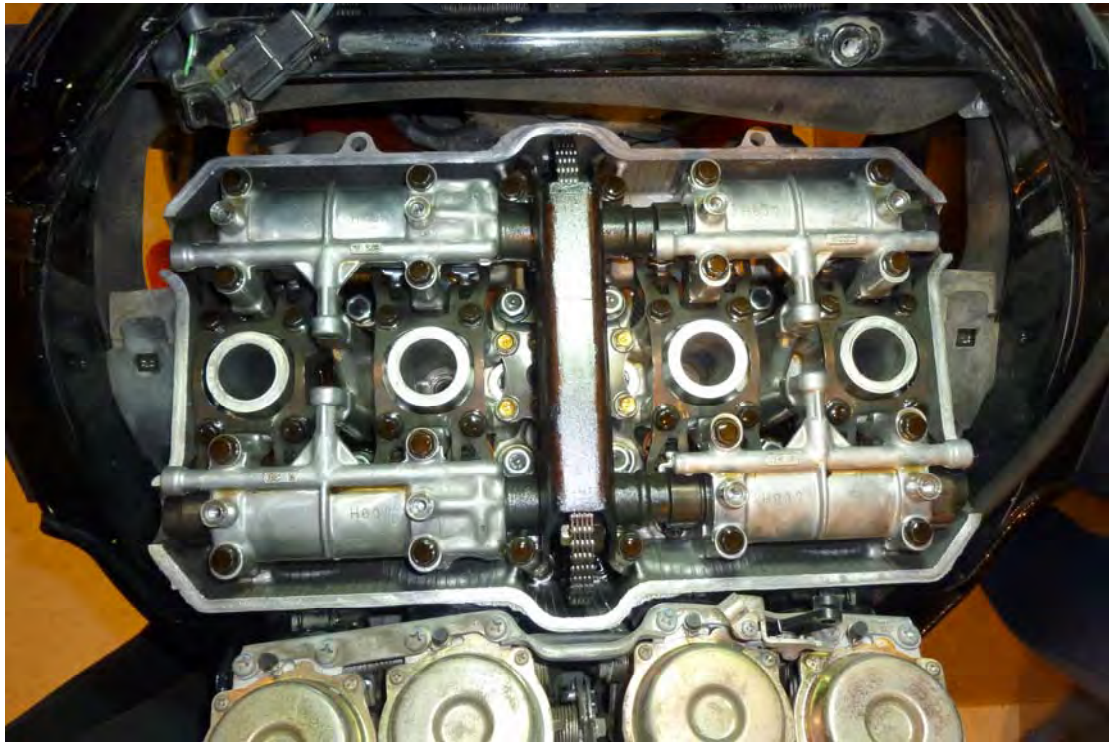


**STAGE 3 - REPLACE THE CCT – NOW WE START**

**Remove the Valve Cover & Gasket.**

This is what you should see!

Remove the old gasket from the Valve Cover and any other residue of the gasket sealer (marked in Red) from the cylinder head and cover. Make sure ALL residues are removed.

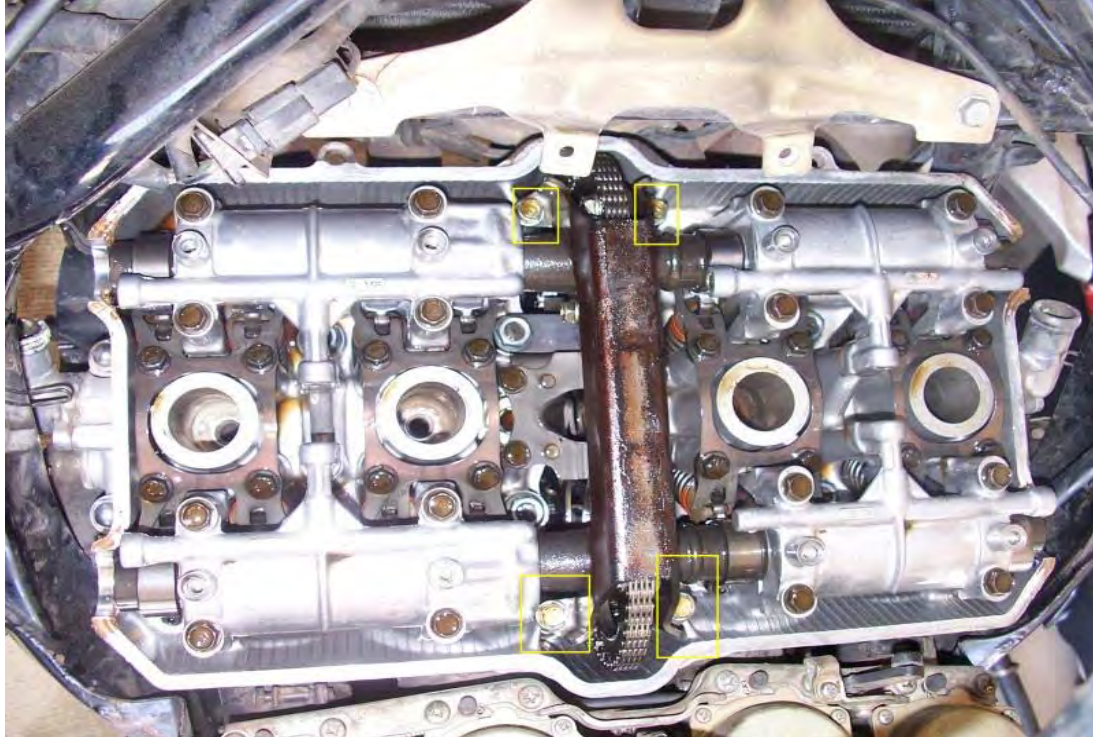




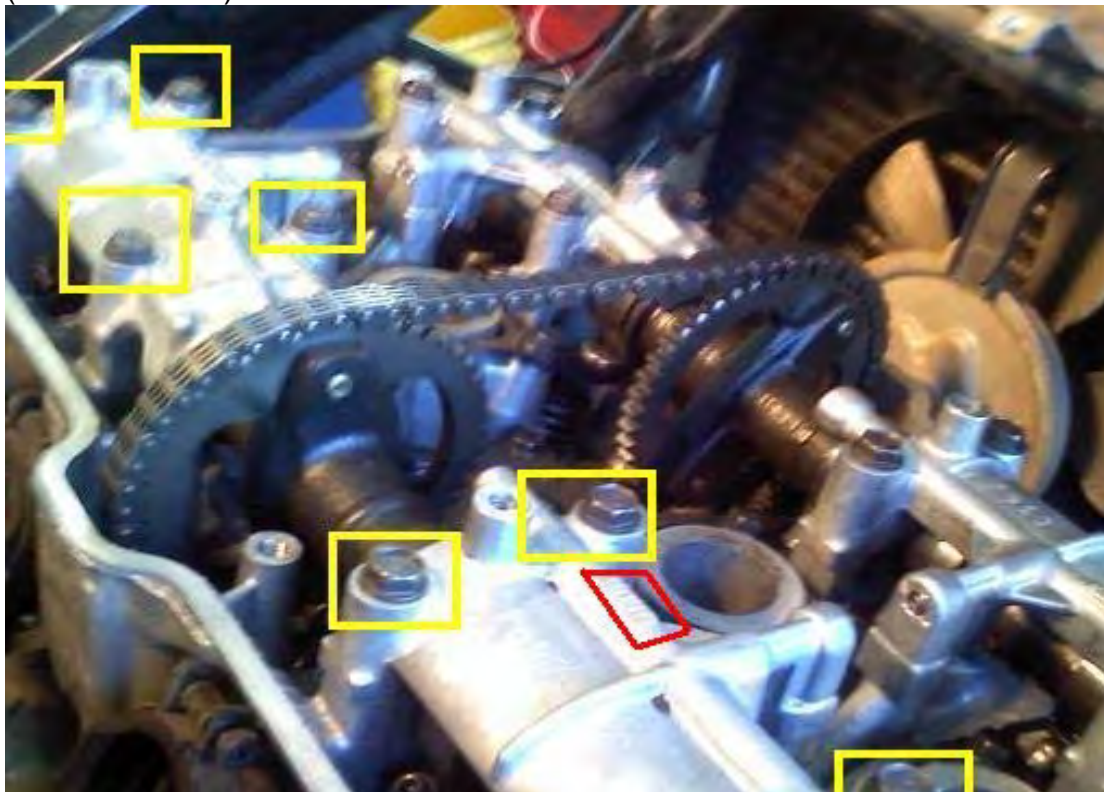




Remove the top chain guide bolts (marked in Yellow). **TAKE CARE FROM THIS POINT ON TO NOT ALLOW PARTS, TOOLS, ECT TO FALL DOWN INSIDE THE ENGINE.** You can retrieve them later, but you will most likely have to drop the oil pan to get 'em! The underside should be smooth; non grooved.



Remove the top cam holder bolts (marked in Yellow) and remove the top of the Cam. Note the cam location (IN L and IN R) for proper re-install location (marked in Red)







**CAUTION: THERE IS ONE O-RING OIL SEAL AND 2 LOCATING DOWEL PINS THAT MAY FALL OUT WHEN REMOVING EACH SIDE CAM COVER. CAREFULLY IDENTIFY THEM AND ENSURE THEY DON'T FALL OUT AND ARE REPLACED IN THE SAME POSITION. I REPLACED THE OIL SEALS WITH NEW ONES. (One was actually missing – a failure on part of dealer when the job was last done.)**

**Cover the engine with rags to prevent dropping parts inside the motor.**







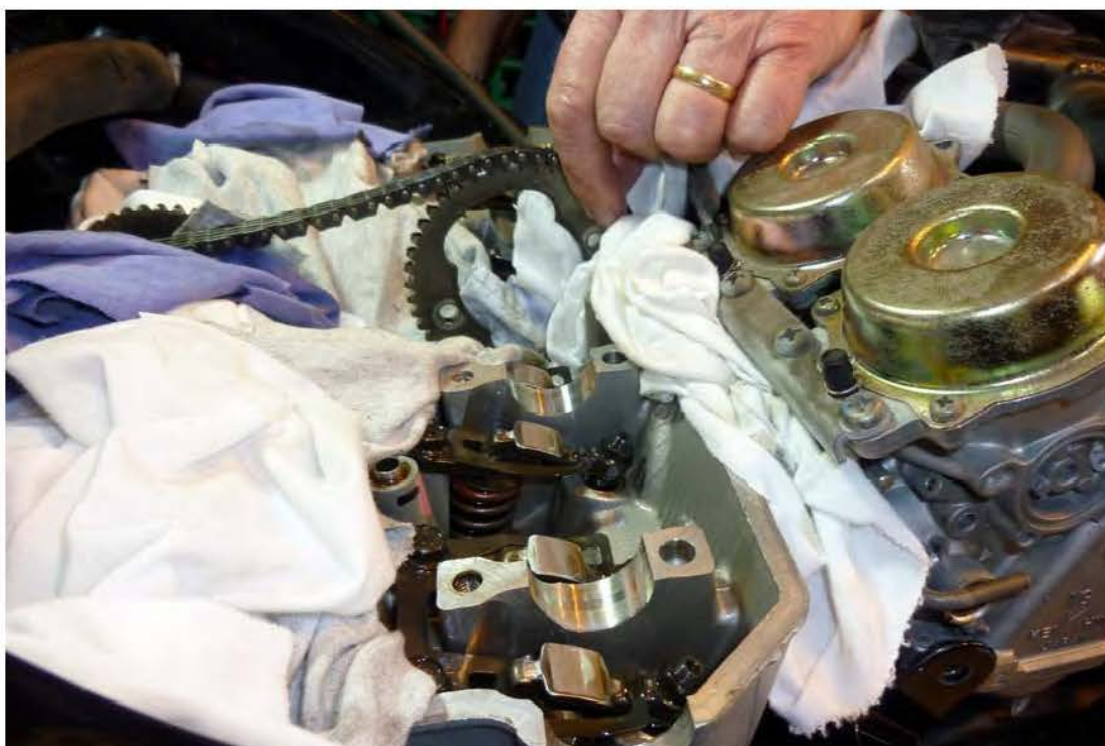


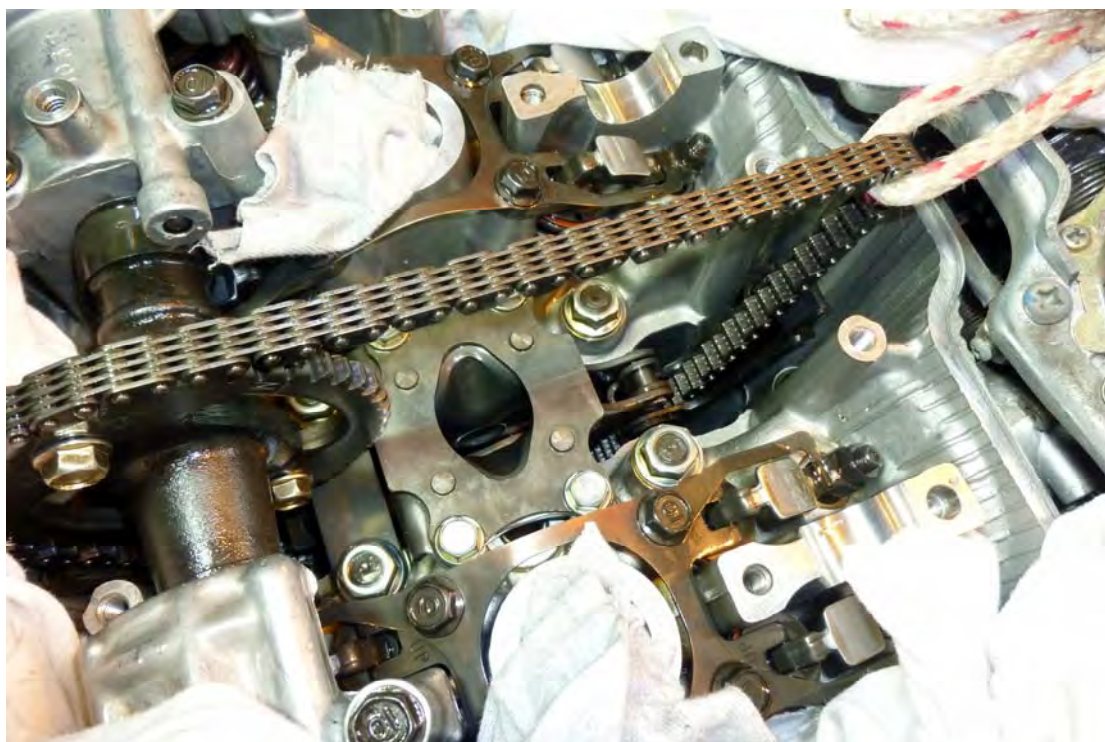
Unbolt the sprocket from the intake cam. Remove the sprocket & intake cam from the engine. You may need turn the motor manually over by using the timing crank on the lower left part of the motor if the bolts are not in the correct place. Alternately, a 10mm ratchet ring spanner, as shown, makes life easier.

(The timing crank bolt is torqued and held with locking agent. But as the motor is turned in an ANTI CLOCKWISE direction the bolt may come loose. In this case, as was mine, re-torque after applying locking agent then rotate rear wheel whist in 6<sup>th</sup> gear to achieve the same result.)



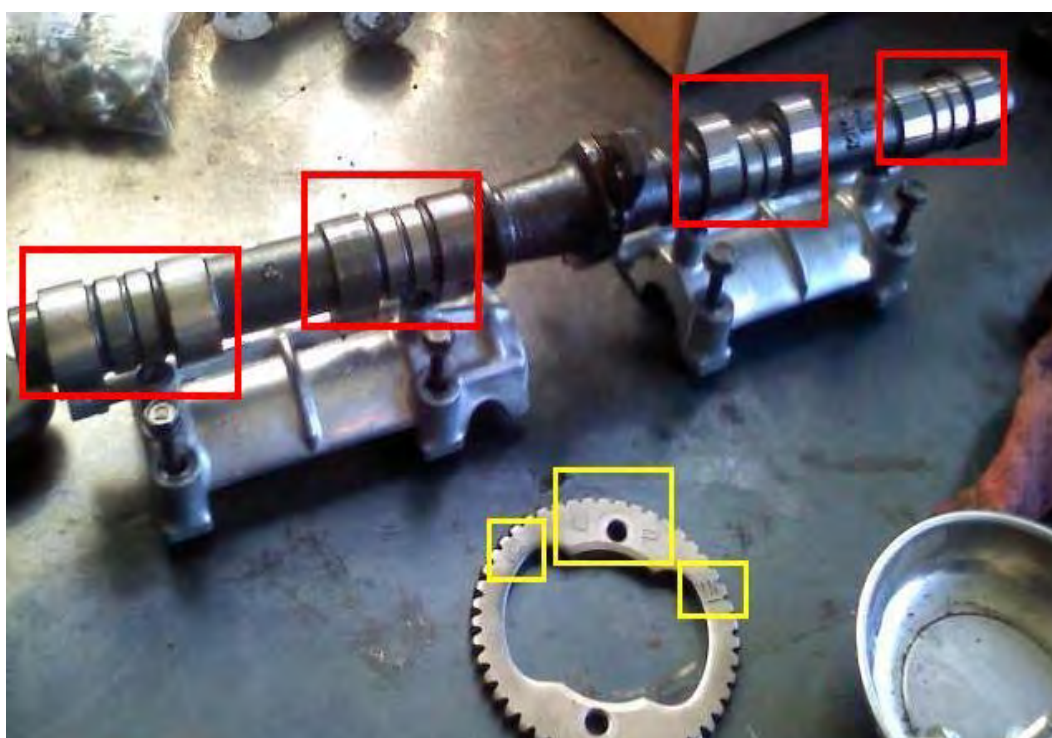






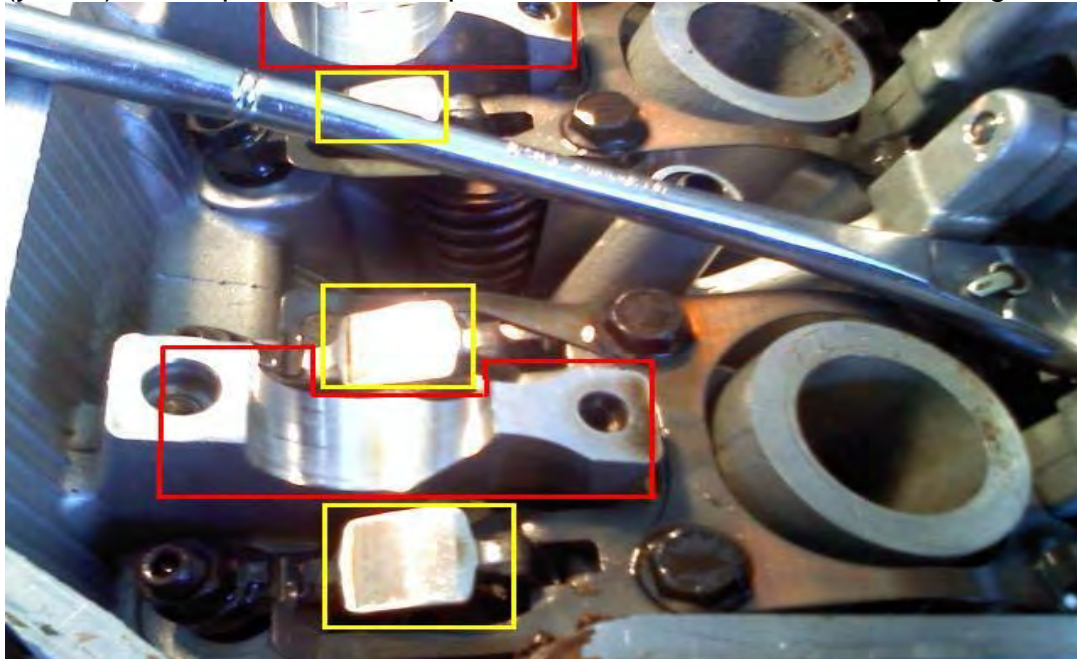
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Look at the camshaft. The cam lobes (marked in Red) should be smooth, free from grooves, and straight. Look at the sprocket teeth for ware and damage. Note the IN / EX timing marks on the sprocket and the UP identification (marked in Yellow). You will need these to reset the correct timing later. The sprocket must be UP and facing the LEFT side of the engine when setting the timing. I will go over this later.

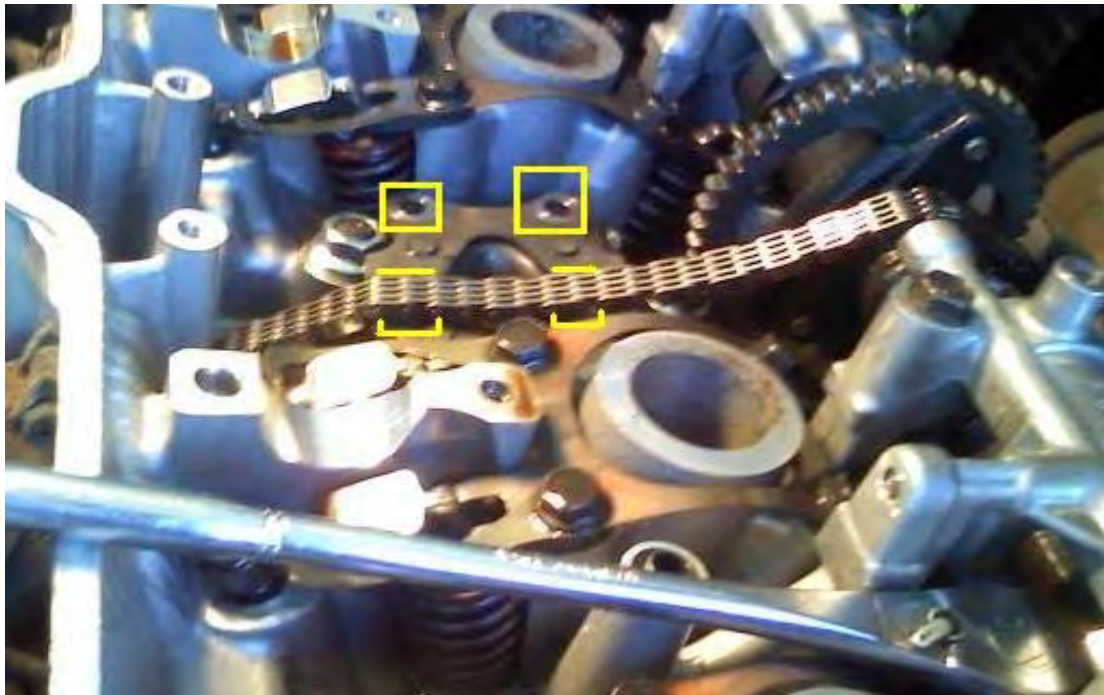


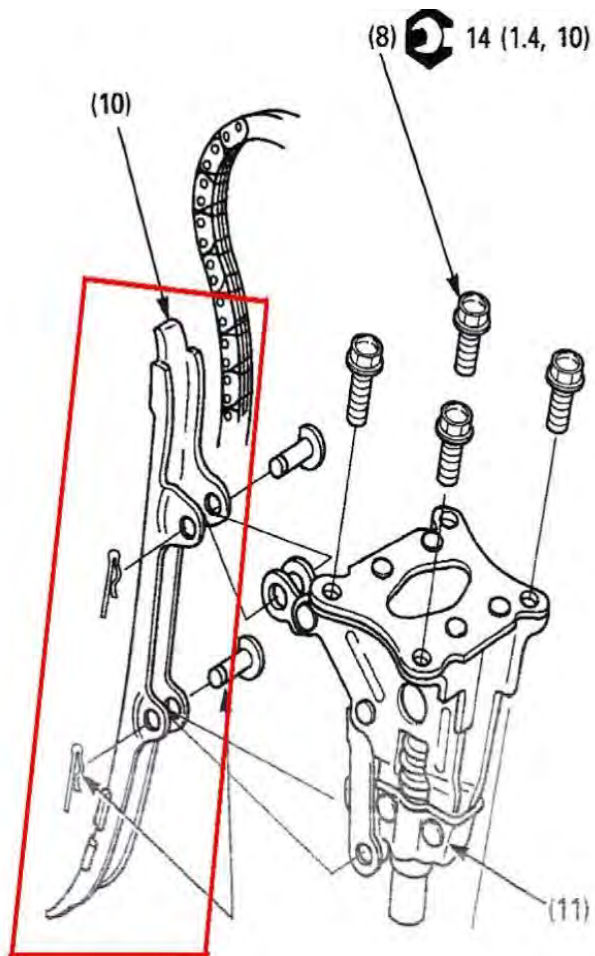


Inspect the cam holder (Red). Like the camshaft it should be smooth and free from grooves. Also inspect the plate (the lifters) the cam lobes roll over (yellow). These plates are what press down the valves and valve springs.

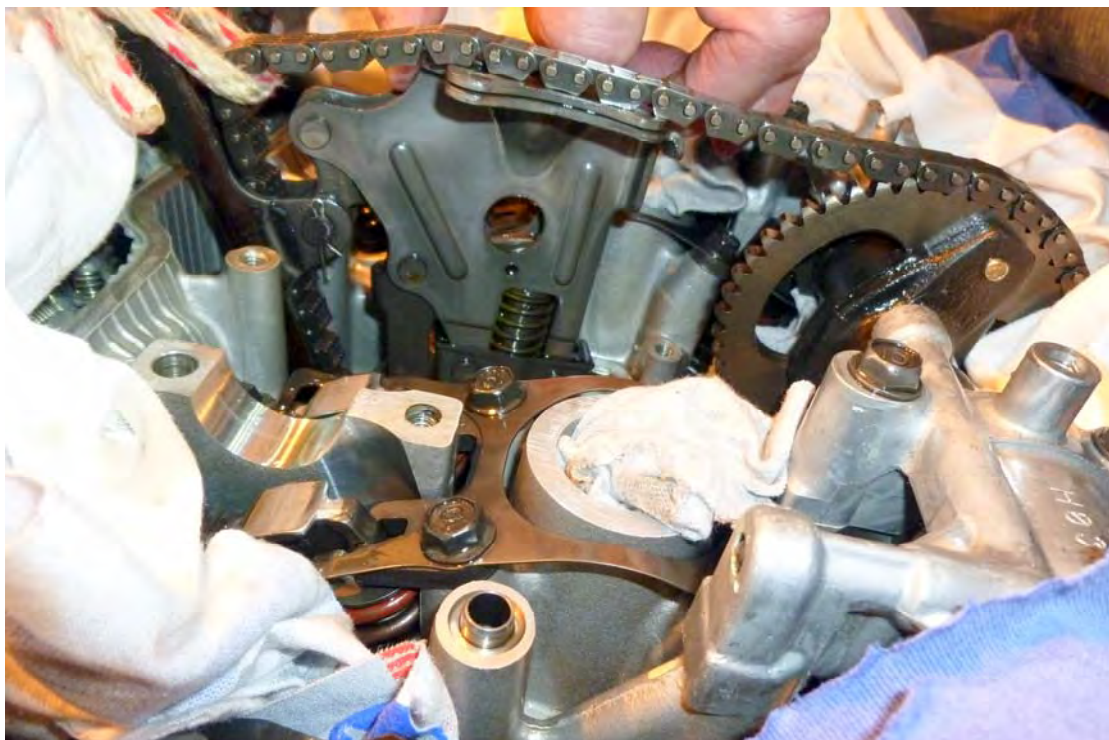


Keep the chain complete; remove the CCT (bolts are marked in Yellow). The REAR CHAIN GUIDE will come out with the tensioner and the chain will still be attached. Remove the 2 pins with the R clips to remove the REAR CHAIN GUIDE (marked in Red). It takes the most wear and damage of all 3 guides. The underside should be smooth; non grooved. The curved end points down.  
**CAUTION: SAFETY ROPE ON CHAIN TO STOP DROPPING IT.**  
**CAUTION: SAFETY WIRE ON "R" PINS PRIOR TO REMOVAL.**

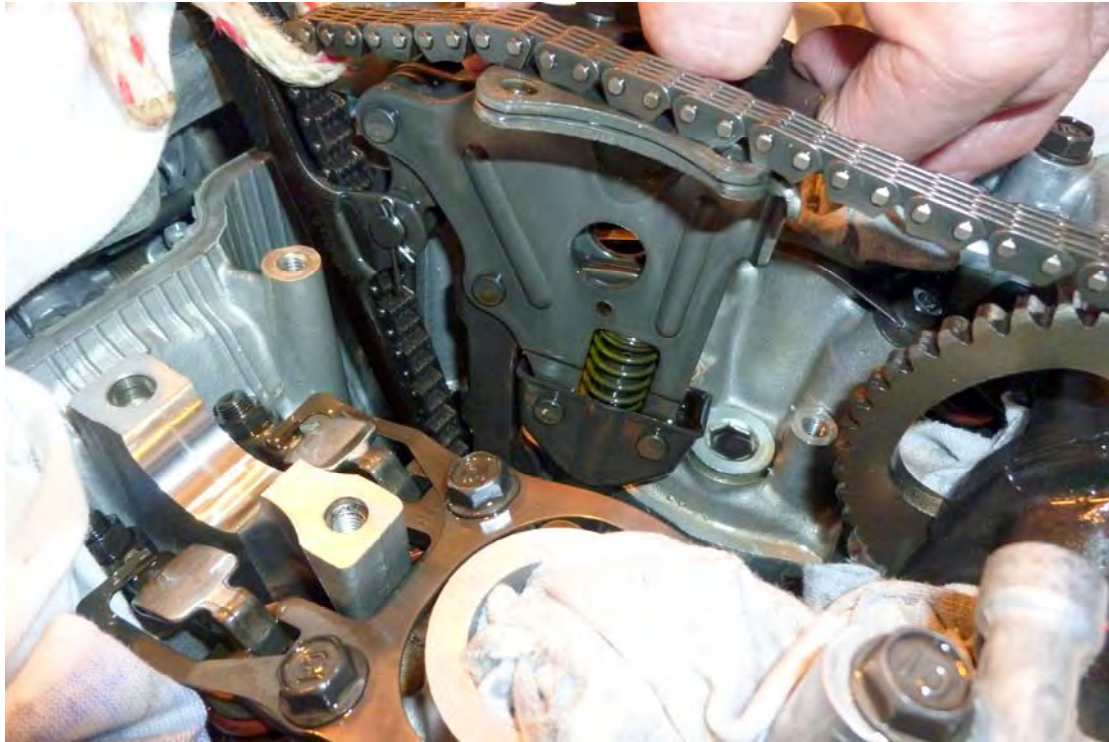




**CAUTION: SAFETY ROPE ON CHAIN TO STOP DROPPING IT.**







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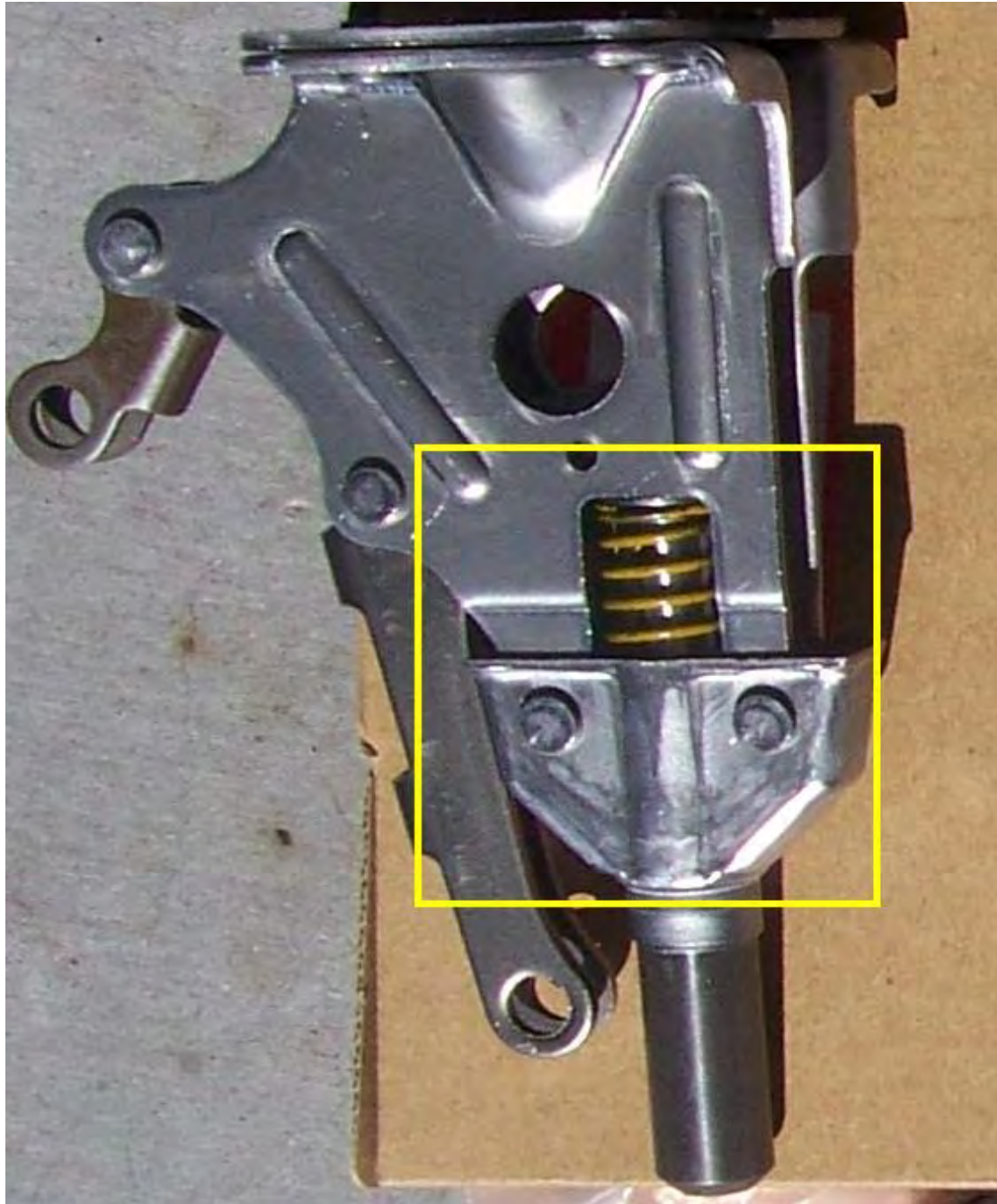
**DO NOT.... PRE-OIL THE TENSIONER BEFORE INSTALLING.**

There has been some advice to do this but it can cause a dampening "hydraulic" lockup requiring you to do a complete re-install later. (It cost me 6 hours of heartbreak and lost time.) So DO NOT....

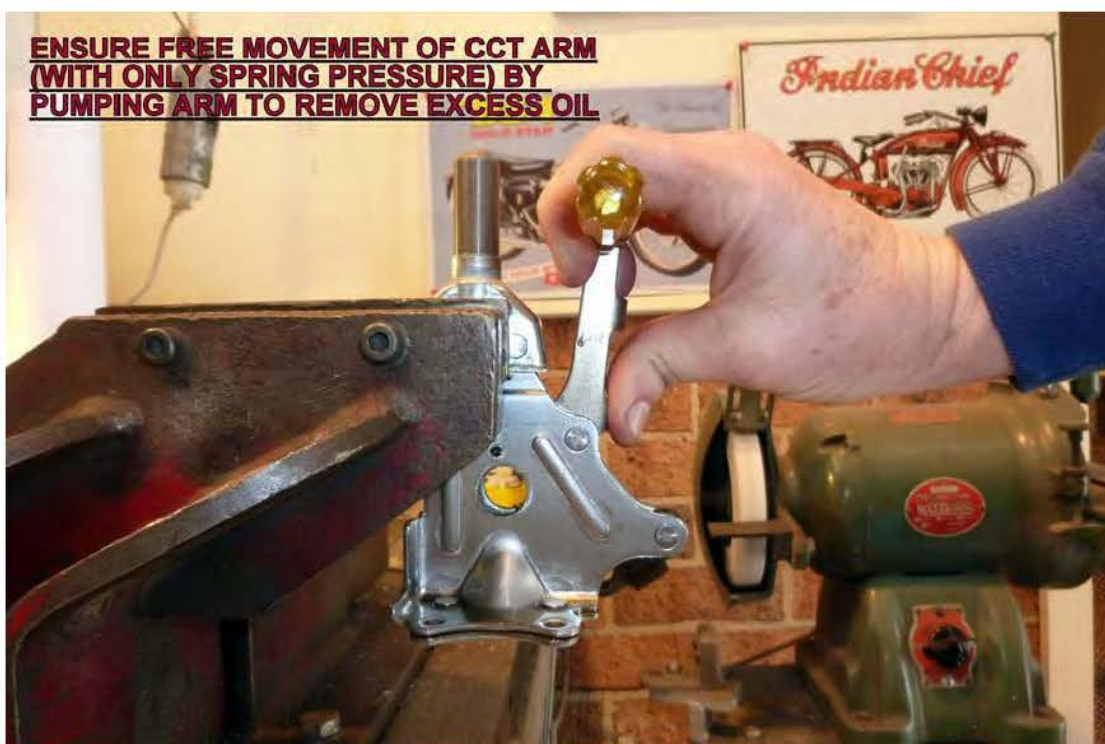


*“Take the automatic tensioner and pre-oil it before installing. Place the tensioner upright and pour a small amount of oil just above the spring (marked in Yellow). The lower resevoir will fill and pump the larger arm to the lower LEFT. The spring will begin to build tension. Pump it until it begins to build pressure.”*

**DO NOT.... FOLLOW THIS ADVICE.**



If you have inadvertently pre-oiled the tensioner then stand it upside down in a vice and let the oil drain out. It may take up to 30 minutes to completely drain. Pumping the lever will assist but don't be surprised if you get no movement till some oil is out.





**STAGE 4 - FOR 1987 or 1988 MODEL ONLY – THE OIL GUIDE**

*If you have a 1987 or 1988 MODEL and are unsure if it has had the CCT retrofit (CCT Kit 04102-MM5-010 ) then you will need to fit these additional parts now:-*

1. PLATE, 14542-MM5-000
2. PLATE, OIL GUIDE 14541-MM5-011

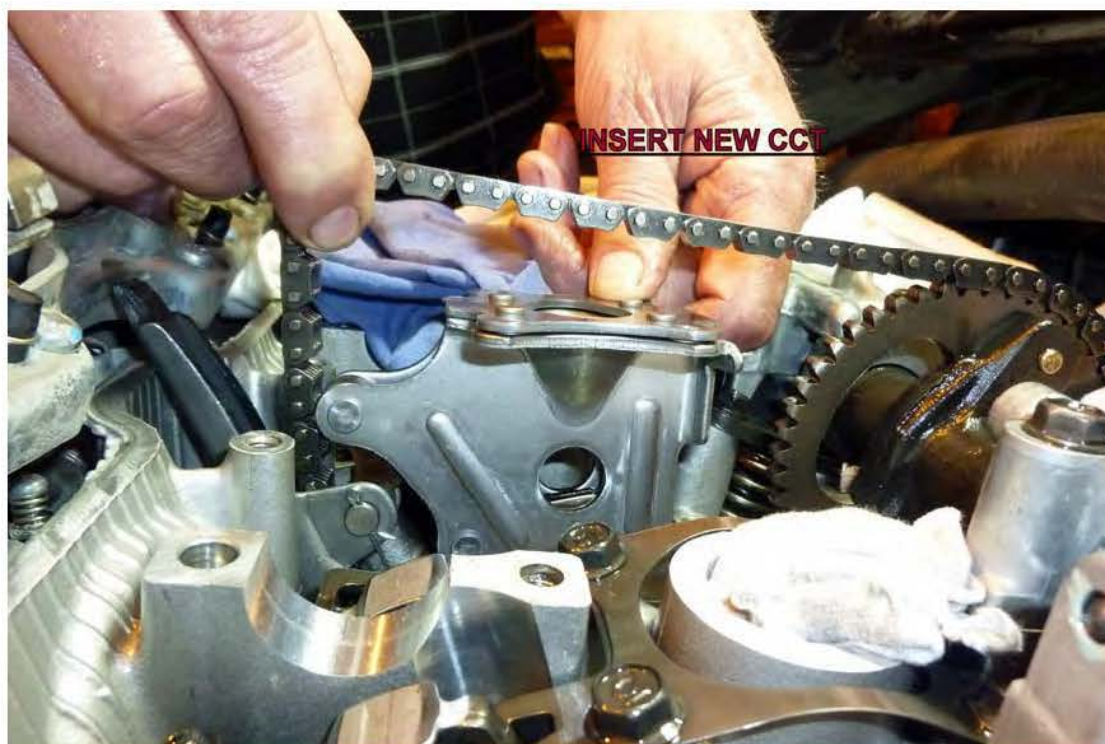
*Replace the Chain Oiler Guide and plate. They will be to the front side of the engine just in front of the tensioner.*



Replace the tensioner and guide. The chain will have to be placed back inside the guide before re-installing the tensioner. Torque to 10 ft-lb



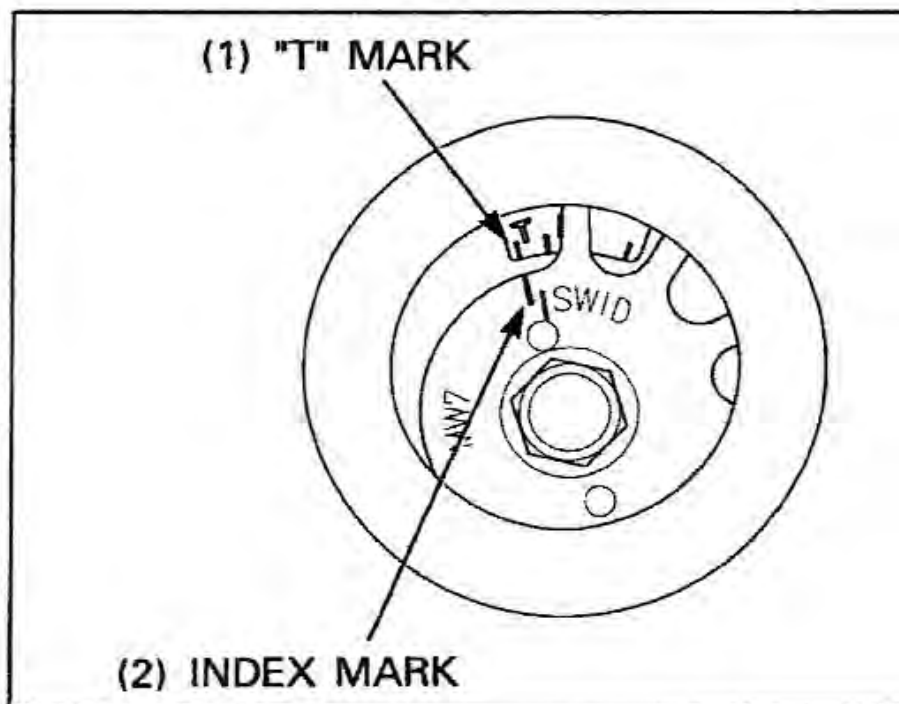




Remove the timing hole cap from the lower left side of the engine (if you haven't already). This is what you should see; the pulse generator with the timing marks on it.

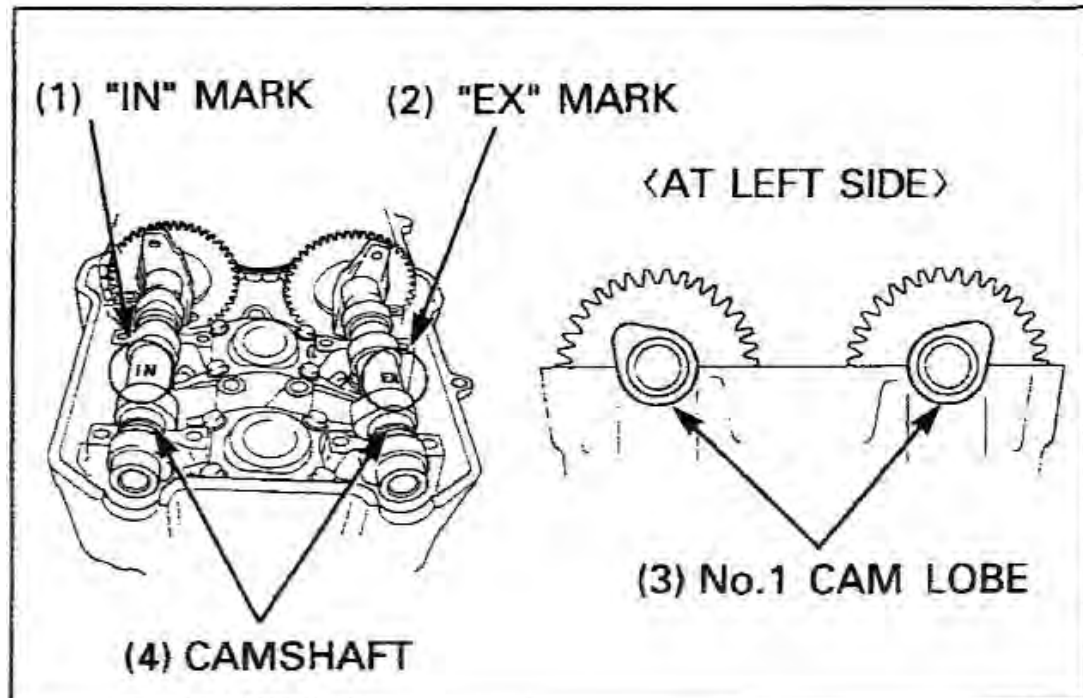


Turn the crankshaft COUNTER-CLOCKWISE with spark plugs OUT, until the index mark on the pulse generator matches up with the "T" mark on the crank case cover. This places the 1st piston into the correct position to time the engine. It puts it into TDC (top dead center). The motor is now in the correct position to time.



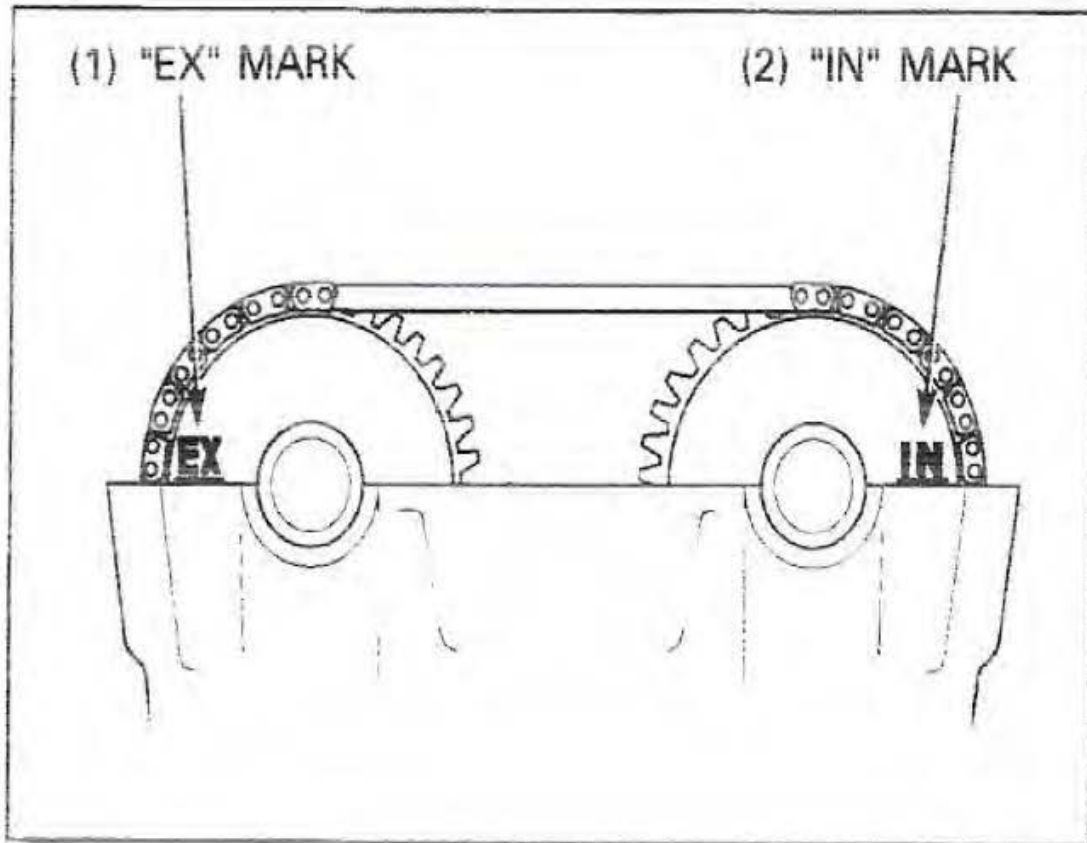
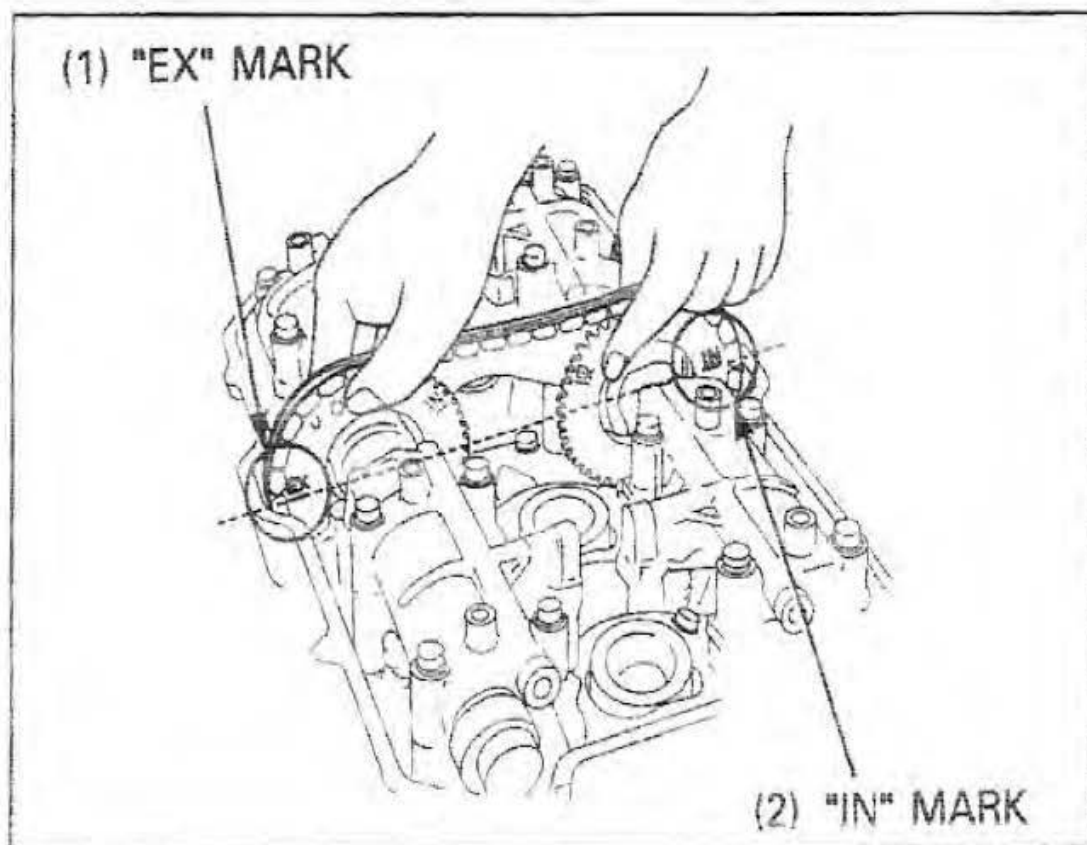


Reinstall the intake cam and do not secure the sprocket at this time. Leave it free, but on the shaft. Be sure to oil the cam before replacing it and make sure the cam holders are in the correct position. **DO NOT OVER-TIGHTEN** these cam holders. Be sure of the correct torque values (10ft-lb). See the picture to get the approximate position they need to be in.



Line the intake and exhaust cam timing marks to the correct location. The EX mark on the exhaust cam needs to line up with the front of the TOP edge of the cylinder head to the front, and the IN mark on the intake cam needs to line up to the rear of the cylinder head. They BOTH need to be in line with each other too. Depress the cam chain tensioner arm with a screwdriver to create slack. Place the OLD timing chain back on the sprockets to keep the cams in the correct place once set. Ensure the cam chain is on the crankshaft sprocket down inside the engine. See the pictures to show proper timing placement.

When the timing marks are in the correct position with the cam chain on the sprockets, recheck the pulse generator to ensure the timing mark is still in the correct position.





**CAUTION: OIL SEALS AND LOCATING PINS.**



When you have the timing marks in the correct position, bolt the intake sprocket back into place. Use a thread locking agent and torque to 12 ft-lb.



Turn the crankshaft COUNTER-CLOCKWISE to verify the timing marks meet up when the motor is turning. There is a 2:1 ratio from the cam sprocket's mark to the pulse generator mark. Meaning as you turn the crankshaft the 1st time the cam marks line up as timed, the pulse generator will not be lined up until the sprockets make another full revolution. The 1st time we turned the motor I was caught off guard; the cams were dead on while the pulse generator was off. One more revolution, everything was perfect. Consistently every 1st turn the pulse generator was off and 2nd everything is perfect. My mechanic friend said this is because there a 2:1 ratio from the pulse generator to the cams.

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**STAGE 5 - NOW THE CAM CHAIN NEEDS TO BE REPLACED.**

Use a grinder to take off the head of the pins.





Use your chain breaker and break the chain. Place a rag down below to prevent the pin from falling down into the engine.







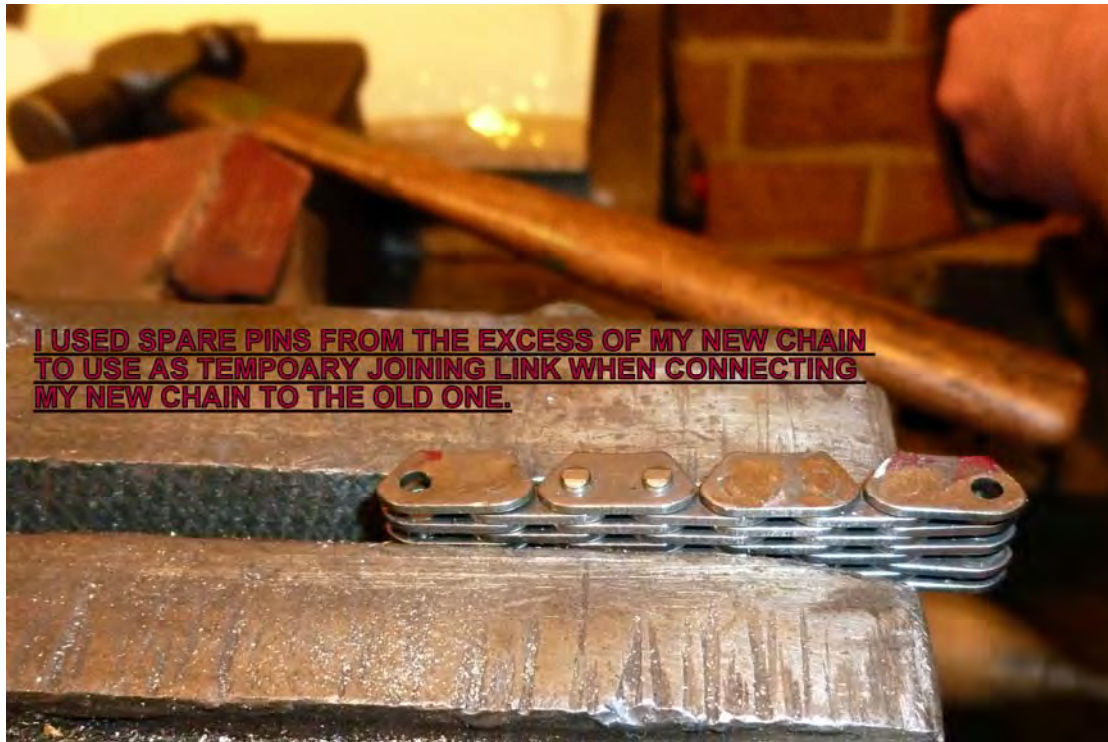
**DO NOT LET THE CHAIN FALL DOWN INTO THE ENGINE!**



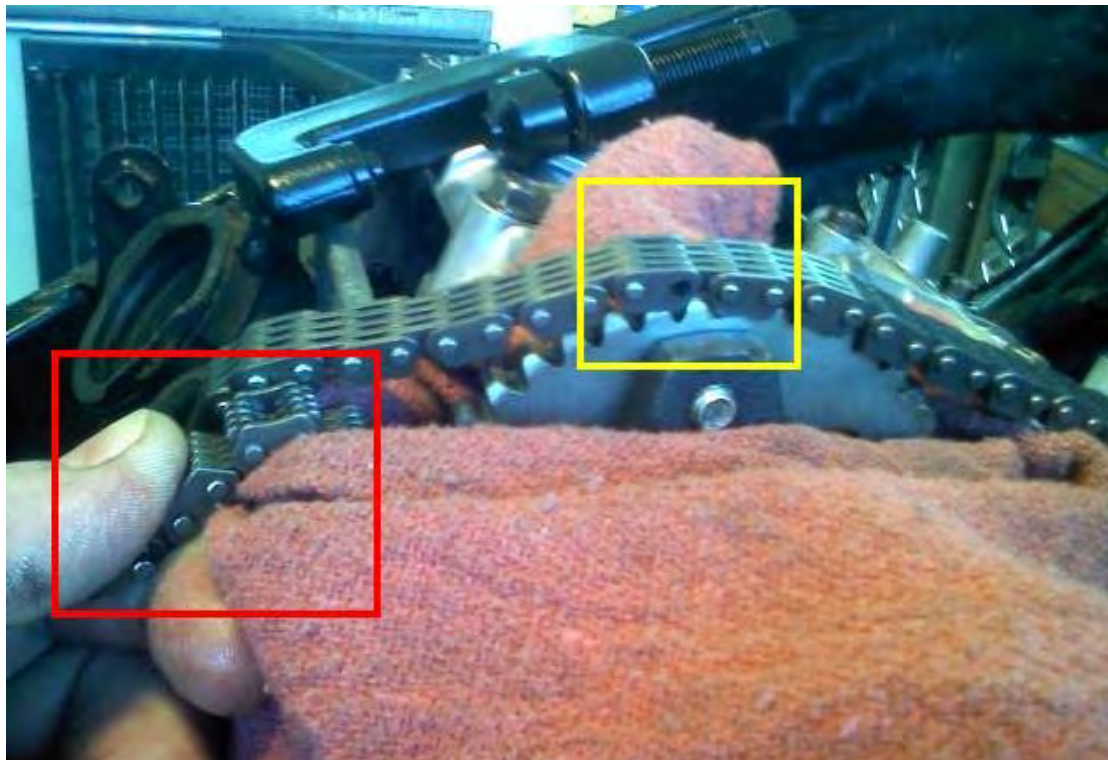


We pressed in an old pin from the old chain to use it to run it through the engine. It may have been overkill to do this, but we did not want to run the chance of the chains coming apart while them running over the crankshaft and through the engine.





Attach the new cam chain to the old chain (marked in Yellow). Hold on to the other end of the chain or attach vice grips to prevent to chain from falling in (marked in Red).



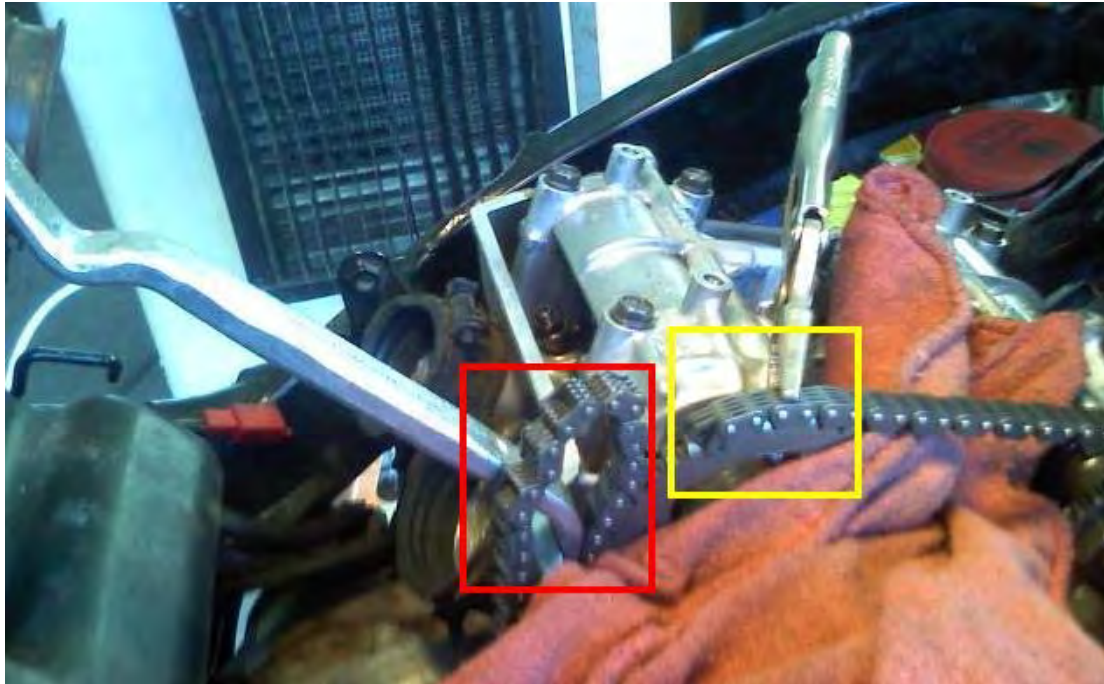


Feed the chain through. Keep strong tension on the new chain to prevent slack and the sprockets jumping (throwing the timing off) as the chain is fed through. Turn the crankshaft SLOWLY, COUNTER-CLOCKWISE and the cams are going to turn. Going slow will help to prevent the sprockets from jumping. The exhaust cam will pull the chain in, and it will feed over the crankshaft, and out the intake cam. If you hold a proper amount of tension and assist the chain through, the cams will turn with the new chain and it will not have to be re-timed when the new chain is in. IF a sprocket jumps while turning the crank address it immediately and again you should have not to re-time. If it jumps a tooth, simply turn it back a tooth.

The old cam chain should have now come through the intake side and it needs to be removed from the new cam chain. Secure the new chain to the intake sprocket (marked in Yellow) and secure the chain to remove the old chain (marked in Red).

If the chain “locks up” and won’t pull through – don’t force it. Just back off a little as the chain can have a tendency to bunch up around the crank sprocket. I had to “go back” 3 or 4 times – it wasn’t a smooth pull through as I had anticipated.

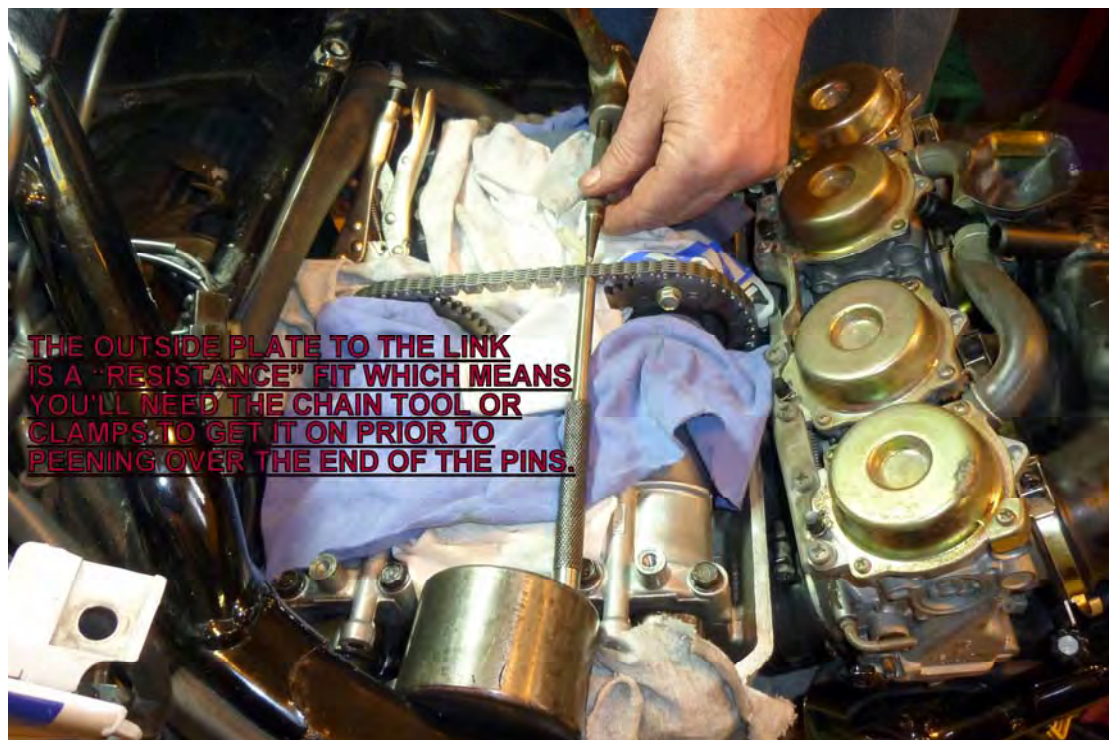




Leave the chain secured to the sprocket. The chain now is free from the old chain and is ready to be riveted. When we did this, we came up 2 links short. At first we thought the chain was too short. What happened was the chain tensioner was fully opened up so the chain was under tension and came up short. To rectify the problem, we placed a screwdriver on the cam tensioner tension arm to release the tension and then there was plenty of slack. The chain now matches up perfectly (marked in Yellow), it is properly tensioned, and the tensioner has plenty of spring left to keep tension up over time.



Use your riveting tool to make the master link connection or use a centre punch.



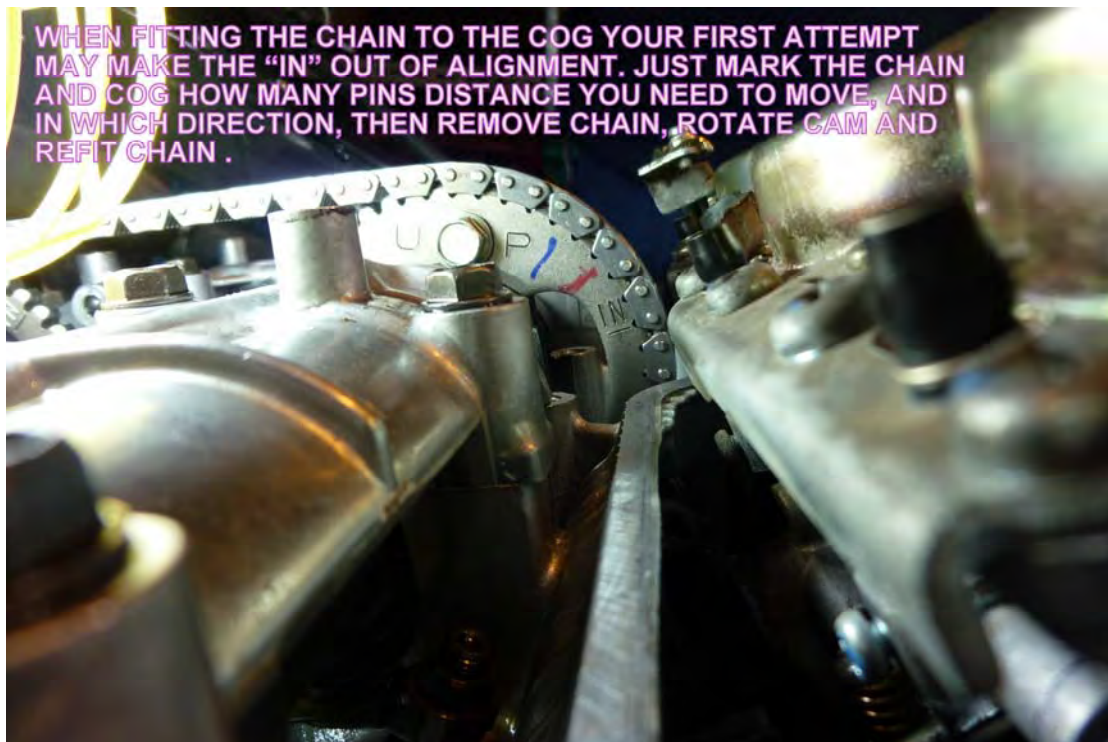


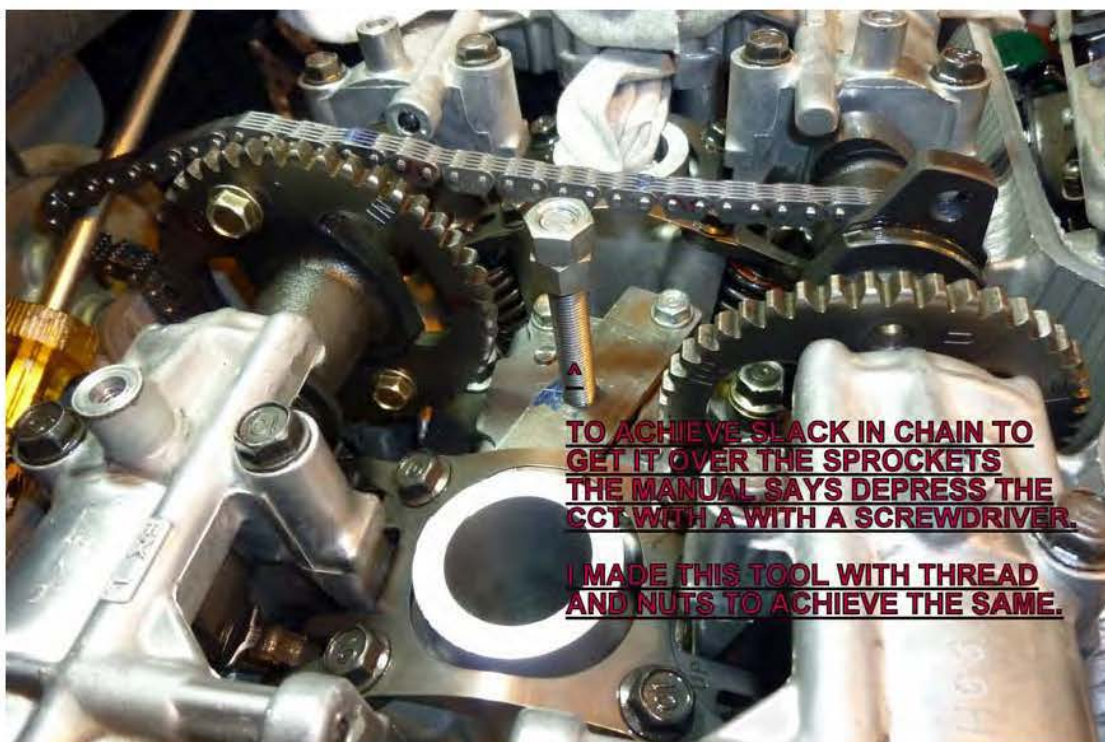


## STAGE 6 – SET THE CAM TIMMING

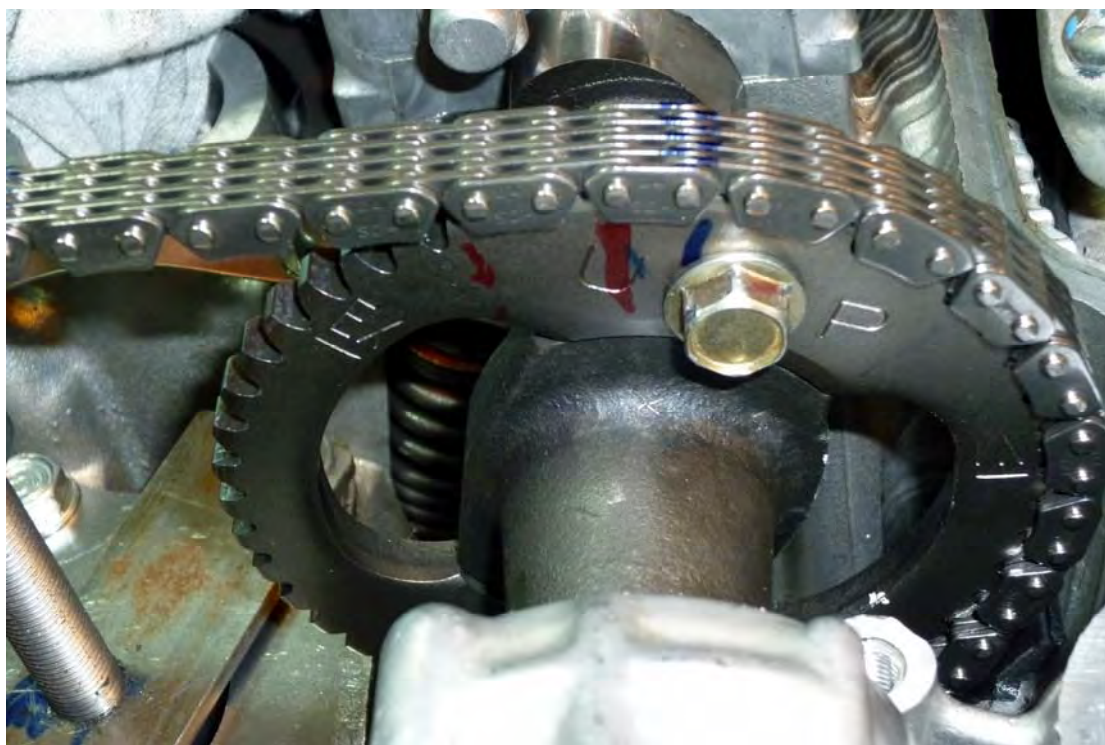
**Recheck the timing - correct as required.....**

Reset the chain on the inlet timing valve gear









**NOW.... PRE-OIL THE TENSIONER BY PORING OIL DOWN ITS THROAT  
(as per workshop manual page 8/7).**

**STAGE 7 - Adjust the Valve Clearances**

**Check and adjust the valve tappets (as per workshop manual page 3/5 to 3/8.) OR CBR FORUM "How TO" <http://cbrforum.com/forum/how-tos-81/how-valve-adjustment-oh-my-god-so-many-pictures-47177/>**





Install the new top chain guide and torque properly.



**Install valve cover with new gasket.**

1. Ensure the cover is completely clean of old gasket cement.
2. Clean new gasket sprits to remove anti stick sheen.
3. Use gasket cement on the cover and press in gasket noting the correct direction (there are arrows on gasket that match to the cover). Allow to dry (30 mins?).
4. Apply loctite 567 to gasket before placing on motor.









Replace spark plugs.



Replace choke and throttle cables. Reinstall coils, plug wires, and gas tank.



Start bike and check for smooth running and timing. The bike may take a few tries to start to allow fuel to get back to the carbs. The chain may also rattle for a minute or two. As long as the motor is running smooth (correctly timed) the rattle will subside soon.

**STAGE 8 - SYNCHRONIZE THE CARBS (For “HOW TO”**

<http://cbrforum.com/forum/how-tos-81/how-carb-sync-balance-many-pictures-115891/>)



**STAGE 9 - RESET THE BACKLASH ADJUSTMENT**

(For “HOW TO” <http://cbrforum.com/forum/how-tos-81/balancer-adjustment-107818/0>)

**REPLACE THE FAIRING PANELS AND GO FOR TEST RIDE.**



**NOW TIME FOR THATY BEER THAT WAS ON THE CONSUMABLES LIST!!**



## Torque Values

Standard			
Fasteners Type	Torque N • m (kg-m, ft-lb)	Fasteners Type	Torque N • m (kg-m, ft-lb)
5 mm hex bolt and nut	5 (0.5, 3.6)	5 mm screw	4 (0.4, 2.9)
6 mm hex bolt and nut	10 (1.0, 7)	6 mm screw	9 (0.9, 6.5)
8 mm hex bolt and nut	22 (2.2, 16)	6 mm flange bolt (8 mm head)	9 (0.9, 6.5)
10 mm hex bolt and nut	35 (3.5, 25)	6 mm flange bolt (10 mm head)	12 (1.2, 9)
12 mm hex bolt and nut	55 (5.5, 40)	and nut	
		8 mm flange bolt and nut	27 (2.7, 20)
		10 mm flange bolt and nut	40 (4.0, 29)

Torque specifications listed below are for important fasteners. Others should be tightened to standard torque values listed above.

Notes: 1. Apply sealant to the threads.

2. Apply a locking agent to the threads.

3. Apply molybdenum disulfide oil to the threads and flange surface.

4. Stake.

5. Apply oil to the threads and flange surface.

6. Apply clean engine oil to the O-ring.

7. Apply grease to the threads and flange surface.

8. UBS bolt.

9. U-nut.

10. ALOC bolt.

Engine				
Item	Q'ty	Thread dia. (mm)	Torque N • m (kg-m, ft-lb)	Remarks
<b>Maintenance:</b>				
Timing hole cap	1	45	18 (1.8, 13)	Note 7
Spark plug	4	12	15 (1.5, 11)	
<b>Lubrication System:</b>				
Oil filter boss	1	20	18 (1.8, 13)	Note 2
Oil filter cartridge	1	20	10 (1.0, 7)	Note 5
Oil drain plug	1	14	30 (3.0, 22)	
Oil pass plate	3	6	12 (1.2, 9)	Note 2
Oil pipe C special bolt	2	6	12 (1.2, 9)	Note 2
Oil pump driven sprocket bolt	1	6	15 (1.5, 11)	Note 2
Oil pump assembly flange bolt	3	6	13 (1.3, 9)	
Oil pressure switch	1	PT 1/8	12 (1.2, 9)	Note 1
Oil pressure switch connector bolt	1	4	2.2 (0.22, 1.6)	
<b>Fuel System:</b>				
Carburetor connecting nut, 6 mm	2	6	10 (1.0, 7)	
5 mm	2	5	5.2 (0.52, 3.8)	
<b>Cooling System:</b>				
Water pump flange bolt	2	6	13 (1.3, 9)	
Water pipe D flange bolt	2	6	13 (1.3, 9)	

Engine (Cont'd)				
Item	Q'ty	Thread dia. (mm)	Torque N • m (kg-m, ft-lb)	Remarks
<b>Cylinder Head/Valves:</b>				
Cylinder head flange cap nut	4	10	45 (4.5, 33)	Note 5
Cylinder head flange nut	8	10	45 (4.5, 33)	Note 5
Cylinder head socket bolt	4	8	26 (2.6, 19)	
Cylinder head sealing bolt	1	18	32 (3.2, 23)	Note 2
Vacuum port socket bolt	1	5	3 (0.30, 2.2)	
Camshaft holder flange bolt	16	6	14 (1.4, 10)	
Cylinder head cover bolt	8	6	10 (1.0, 7)	
Boost joint	3	5	2.5 (0.25, 1.8)	
Cam sprocket bolt	4	7	20 (2.0, 14)	Note 2, 8
Valve adjuster screw lock nut	16	7	23 (2.3, 17)	Note 5
Cam chain tensioner bracket bolt	4	6	14 (1.4, 10)	
Rocker arm guide bolt	16	6	12 (1.2, 9)	Note 8
<b>Clutch /Gearshift Linkage:</b>				
Clutch center lock nut	1	25	128 (12.8, 93)	Note 5
Clutch spring bolt	5	6	12 (1.2, 9)	
Clutch slave cylinder bleeder screw	1	8	8 (0.8, 5.8)	
Shift fork shaft stopper plate bolt	2	6	12 (1.2, 9)	Note 2
Shift drum center bolt	1	8	23 (2.3, 17)	Note 2
Gearshift spindle return spring pin	1	8	22 (2.2, 16)	
Drive sprocket special bolt	1	10	54 (5.4, 39)	
Clutch slave cylinder oil bolt	1	10	35 (3.5, 25)	
<b>Crankshaft/Transmission:</b>				
Crankcase main journal bolt	12	9	37 (3.7, 27)	Note 8
Crankcase flange bolt	10	1	39 (3.9, 28)	
	8	17	24 (2.4, 17)	
Crankcase sealing bolt	20	1	30 (3.0, 22)	
	10	1	12 (1.2, 9)	
Connecting rod nut	8	8	35 (3.5, 25)	Note 5
Balancer shaft holder flange bolt	1	6	12 (1.2, 9)	
<b>Charging System/Alternator:</b>				
Alternator base flange bolt	3	8	25 (2.5, 18)	Note 1
Alternator assembly flange socket bolt	3	6	8 (0.8, 5.8)	Note 2
Alternator shaft flange nut	1	12	49 (4.9, 35)	Note 5
<b>Ignition System:</b>				
Pulse generator rotor flange bolt	1	10	49 (4.9, 35)	Note 2
<b>Lights/Meters/Switches:</b>				
Neutral switch	1	10	12 (1.2, 9)	
Neutral switch terminal nut	1	4	2.2 (0.22, 1.6 )	
<b>Other:</b>				
General torque: SH flange bolt	—	6	10 (1.0, 7)	
SHF flange bolt	—	6	12 (1.2, 9)	



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