MT Riders Club
forum

Rotax Sprag Replacement

This is intended as a full walk through on a Sprag replacement on a Electric start Rotax engine

These instructions were made from a sprag replacement on an MT 350

Tools List

Non Specialist Tools

13 MM Spanners X 2

4,5,6 mm Allen Keys

13mm socket

24mm socket

10mm spanner

27mm Socket

Loctite 221

Specialist Tools

Top pulley puller

75mm puller

Torque Wrench

Parts we Used

Timing Belt P/N 280-015

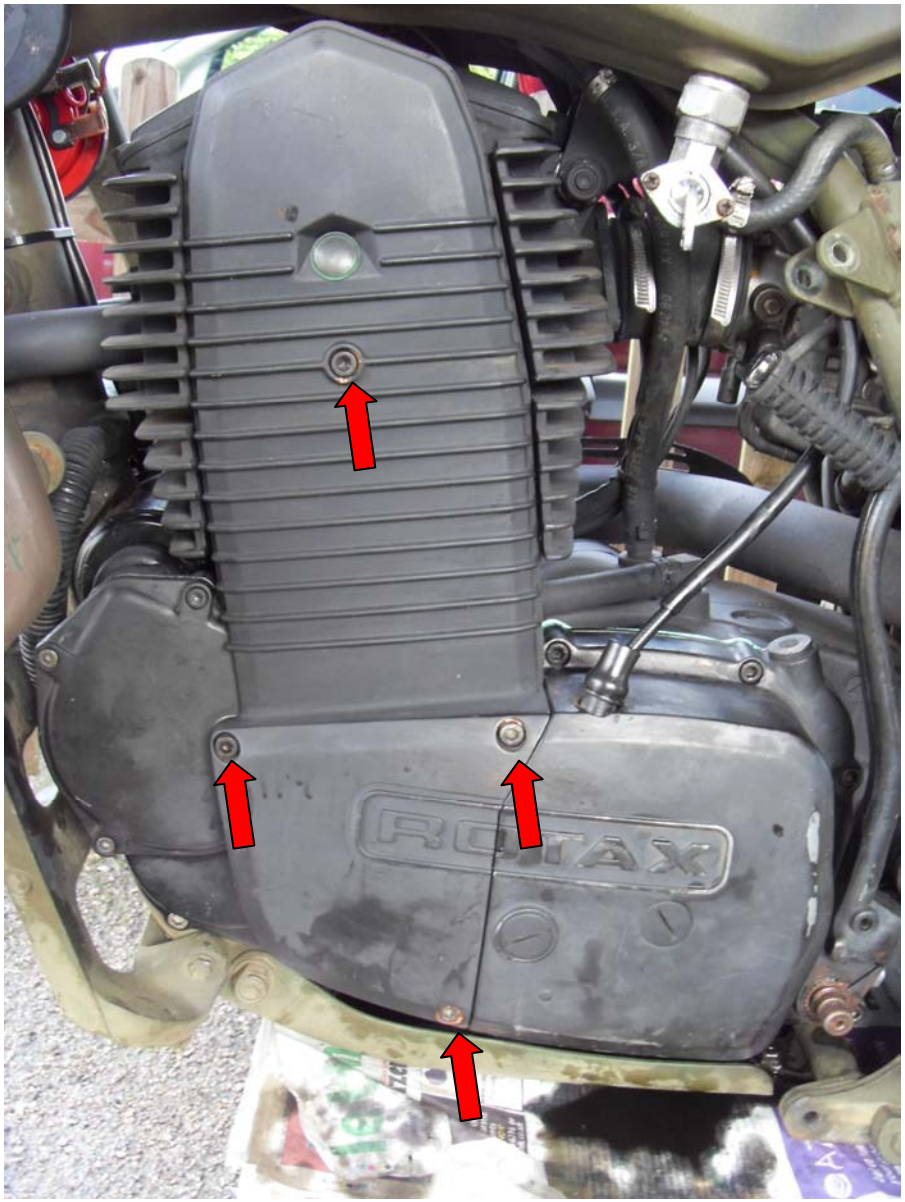
Clutch Cover Gasket P/N 250-381 *
Starter Gear Cover O ring P/N 230-310
Timing Pulley Oil Seals P/N 930-715
kick Start Shaft Oil Seal P/N 831-260
Circlip Kick-start Shaft P/N 245-350
Sprag Clutch P/N 259-075 *

Loctite 221 (alternative) *

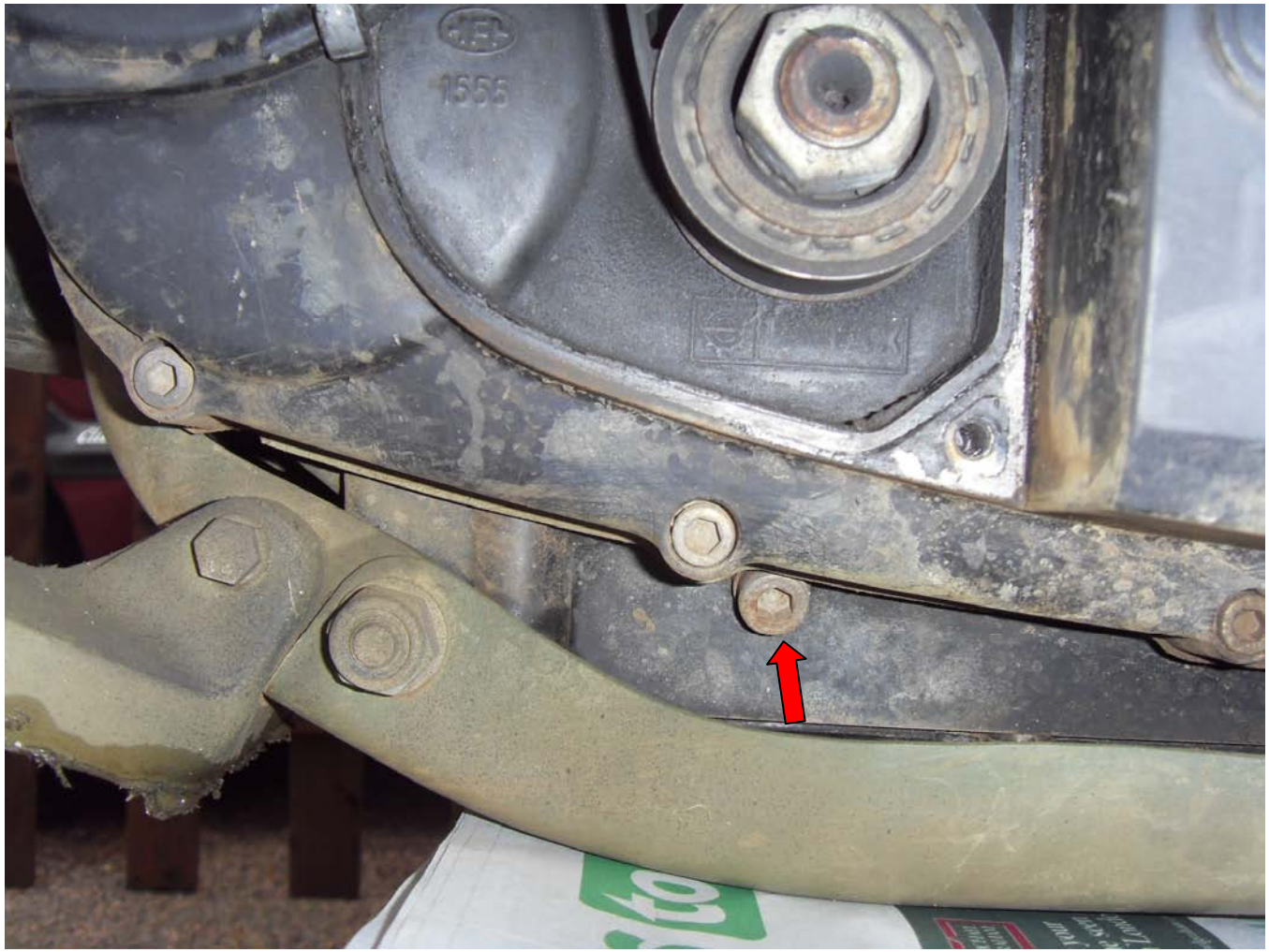
The parts marked with a star are the parts that you will need for this job we changed some other parts as preventative maintenance

The first part of the disassembly is to remove the strengthening bar over the cam belt casing you will need 2X 13 mm spanners to do this once removed this will give you access to take the Cam belt cover

Using a 5mm Allen Key remove the Four Marked Cap Head Bolts

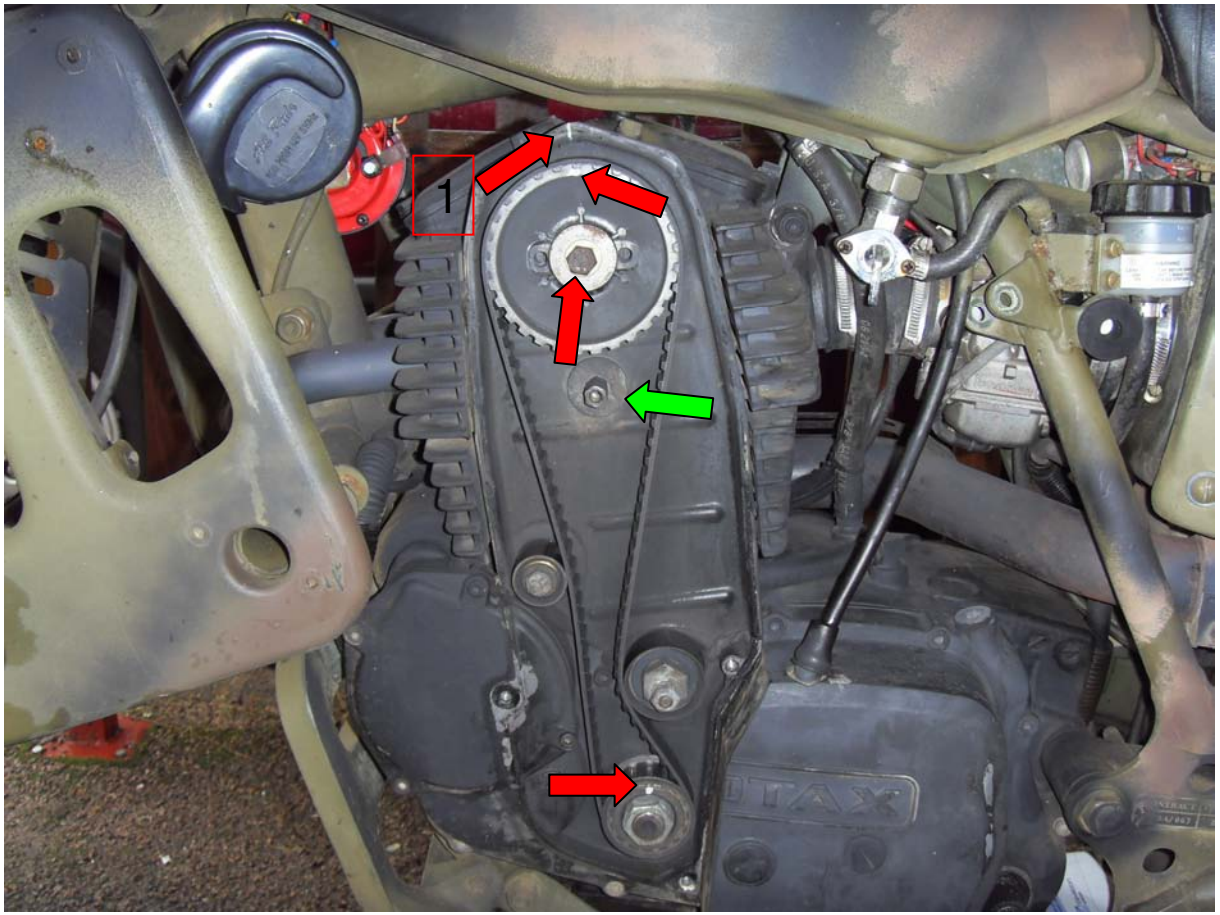


The marked Cap head is where the Crank Locking bolt needs to be put first remove the cap head with a 6mm Allen Key and using a torch locate the V in the crank and align it to the centre of the Hole



Screw in the crank Locking Bolt until finger tight then just nip it up this is all that is required to lock the crank.

Using a white marker pen, mark the indented marks on the lower and top pulleys.
Using a straight edge through the centre of the lower Pulley and following through the centre of the fixing stud marked with the green arrow and the mark on the top pulley I also made a mark on the outer casing giving an indication of where the timing was set to before starting the work.
Use a 13 mm socket to remove the Bolt in the centre of the top pulley

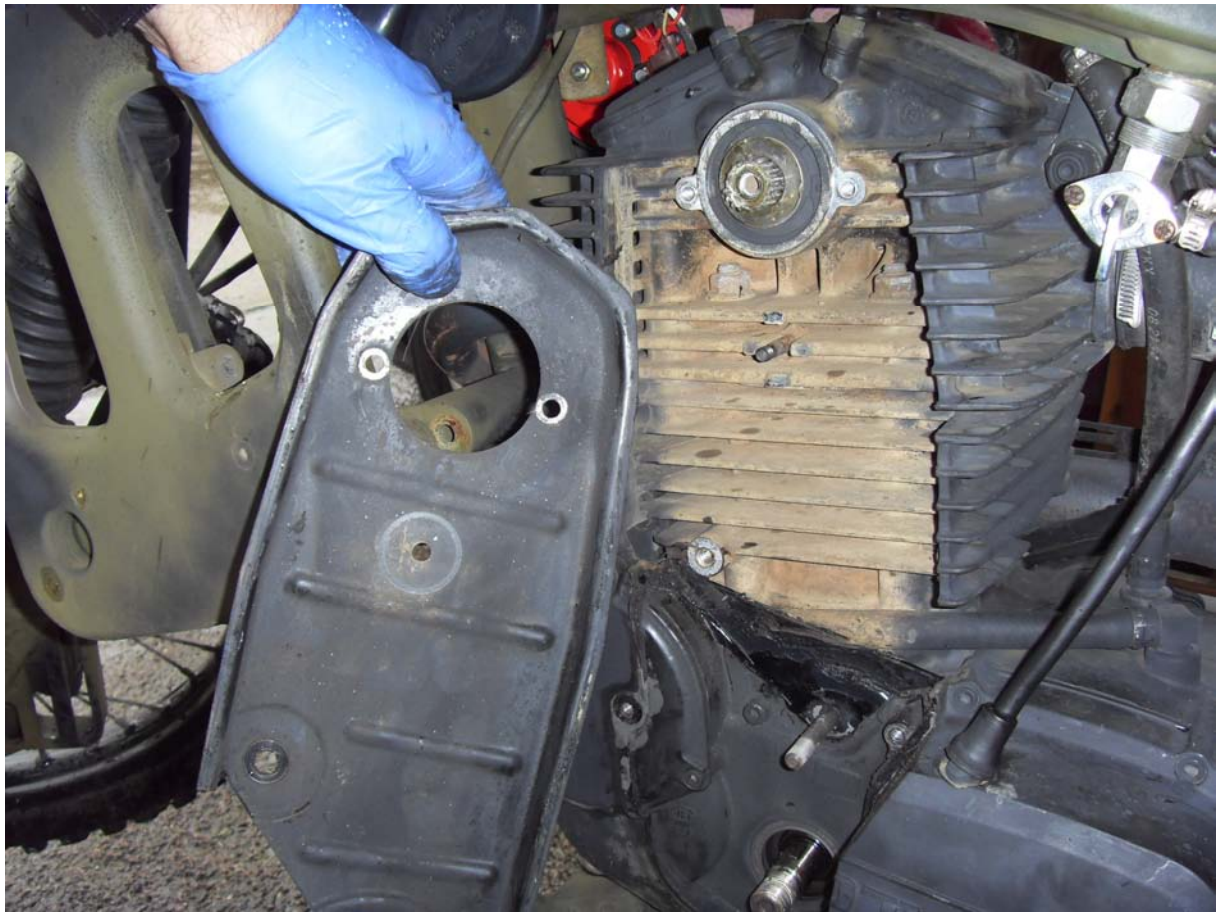


With the Cam Belt tensioner Removed using a 13mm Socket(1) I Marked the direction on the Cam belt (2) this was not needed on this Job as we replaced the Cam Belt but if you are doing this with out replacing the Belt then it is required to put the belt back the way it came off.

With the cam belt runner removed and the cam belt removed using a puller this one is home made remove the top pulley

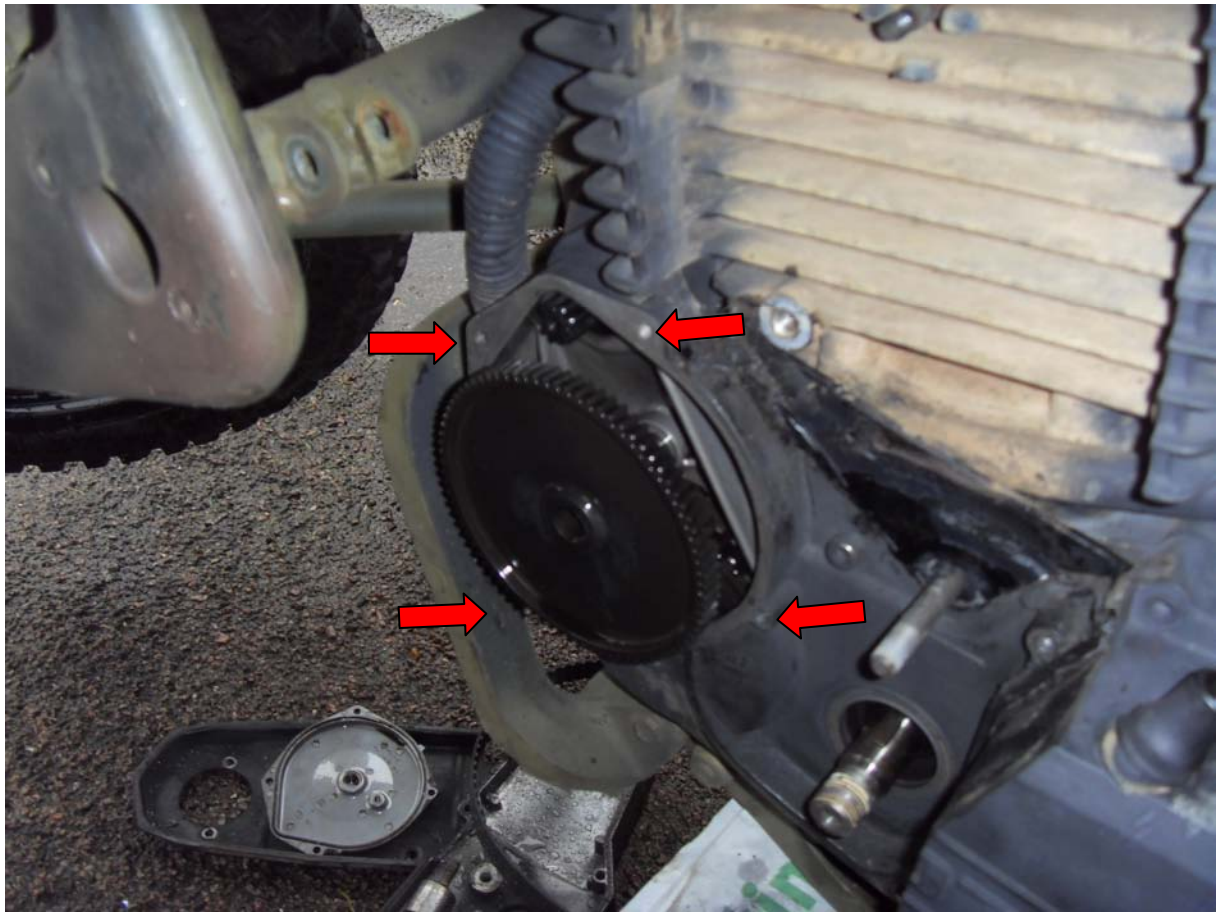
Using a 24mm socket remove the nut on the lower pulley I use a 75mm puller to remove the lower Pulley but there is a Rotax tool for the Job.
Taking care and watching to see that the pulley doesn't get damaged slowly wind the pulley off.

Using a 5mm Allen key and a 10mm spanner remove the two top cap heads and the fixing stud and you will be able to remove the upper back Cam belt casing



Using a 4mm Allen Key you will now be able to remove the Starter gear cover
with the cover removed it is farley easy to slide the gear off there are two washers in the assembly the thicker one is from the rear.

Behind the gear is two Cap heads using a 5mm Allen Key remove these and the rest of the Cap heads on the clutch casing.

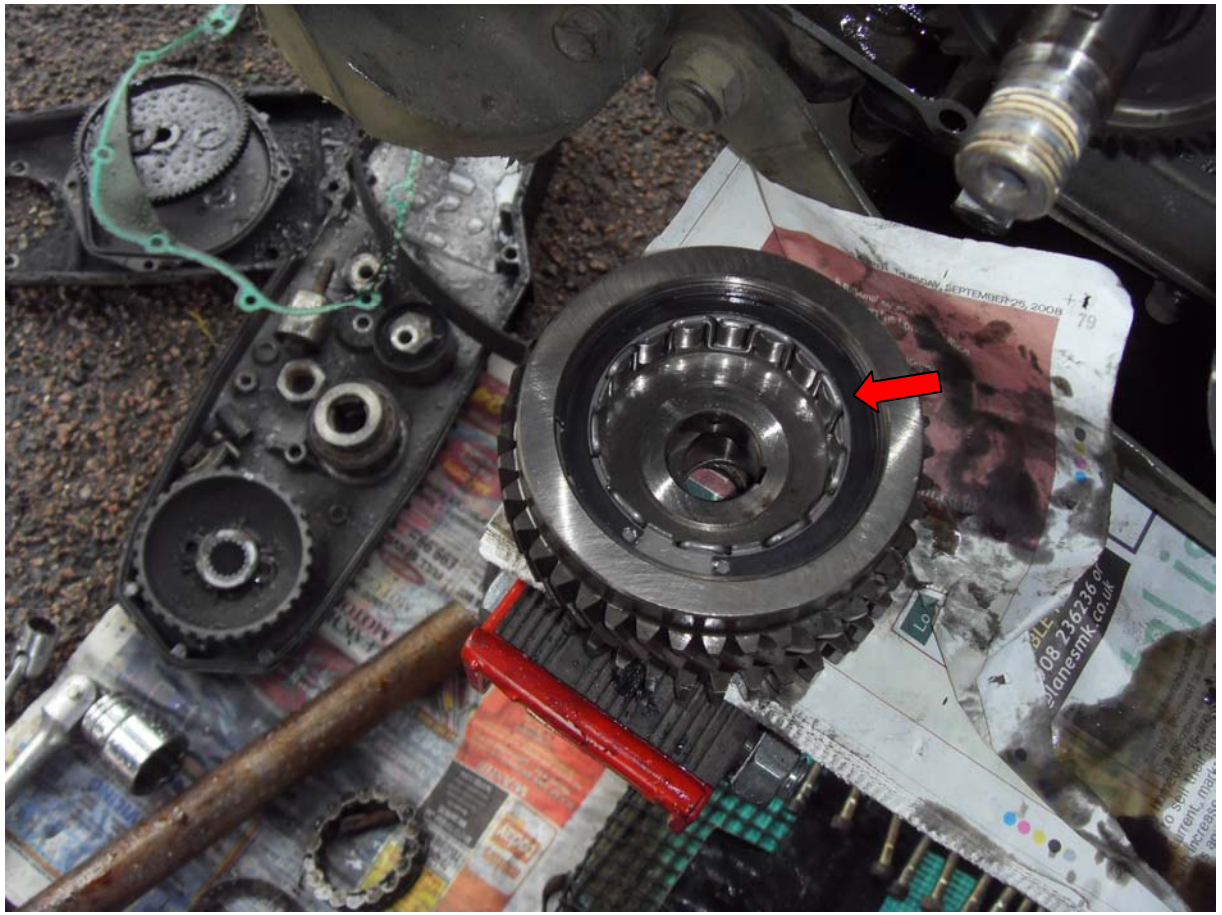


with all the Cap heads Removed the last thing to do is remove the Cir clip and O ring from the kick start and gear leaver

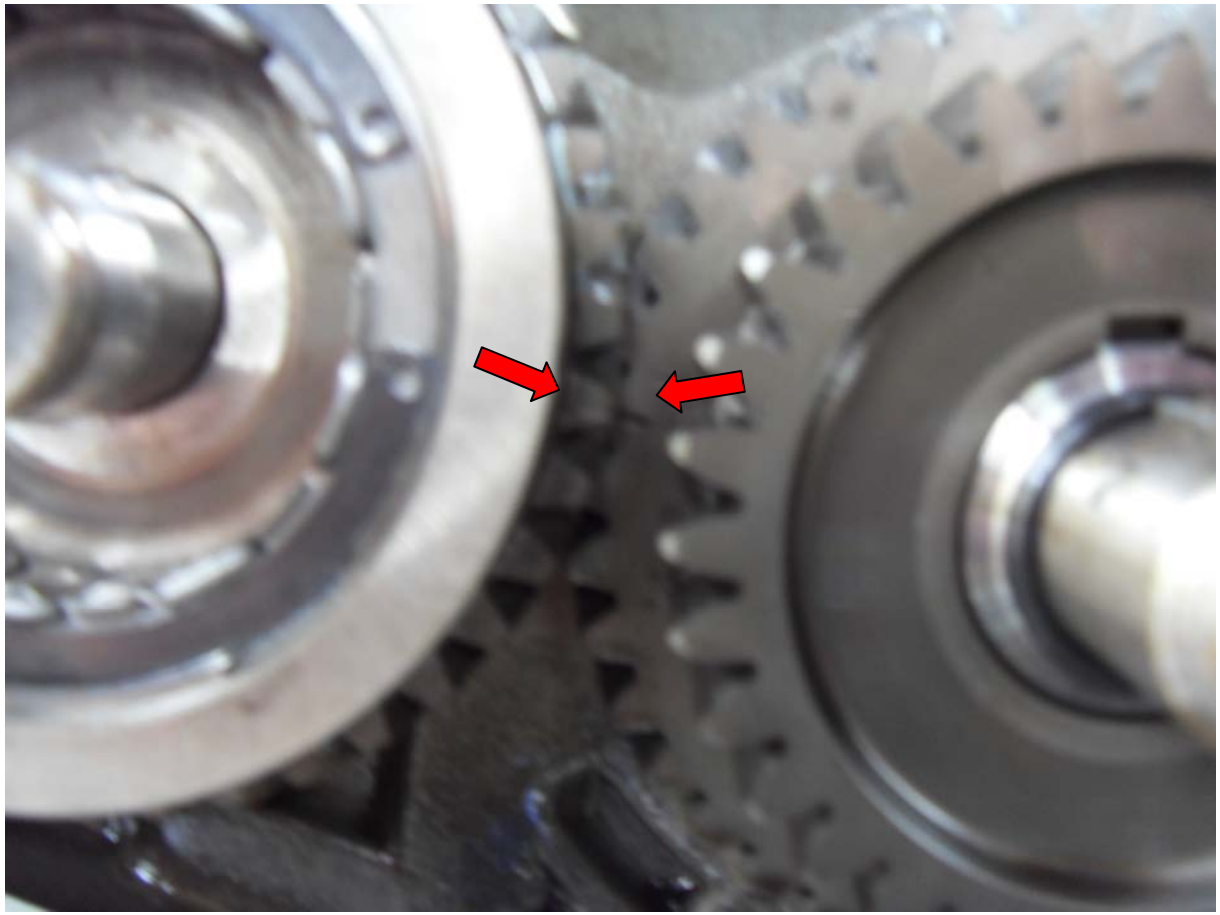
Now gently pull the casing off the side if the engine you may need some help as the starter motor is still in place
you will get some oil out of the casing as it settles in the casing.

With the clutch casing removed use a 27 mm socket to remove the nut holding the Sprag gears

There is a holding clip you can remove this with a Screw driver.
Once this is removed you will need to use a set of internal cir clip pliers to remove the sprag clutch and also to put the new one in.
once the new sprag is in place, clip the retaining clip back into the recess above the sprag to hold it in place.



When replacing the spag gears back on there is a mark on the two gears that need to be lined up line these up and then place the outer gear of the sprag assembly back on to the shaft

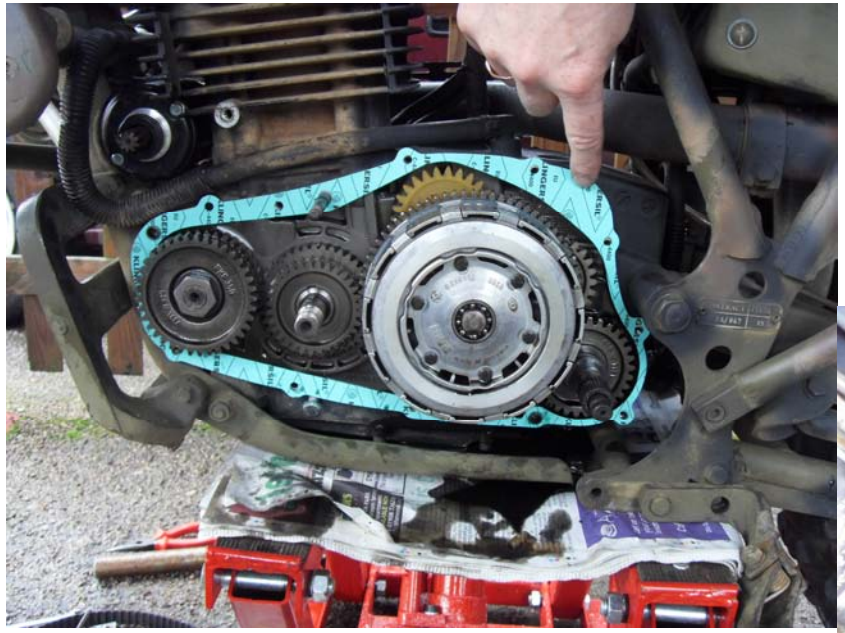


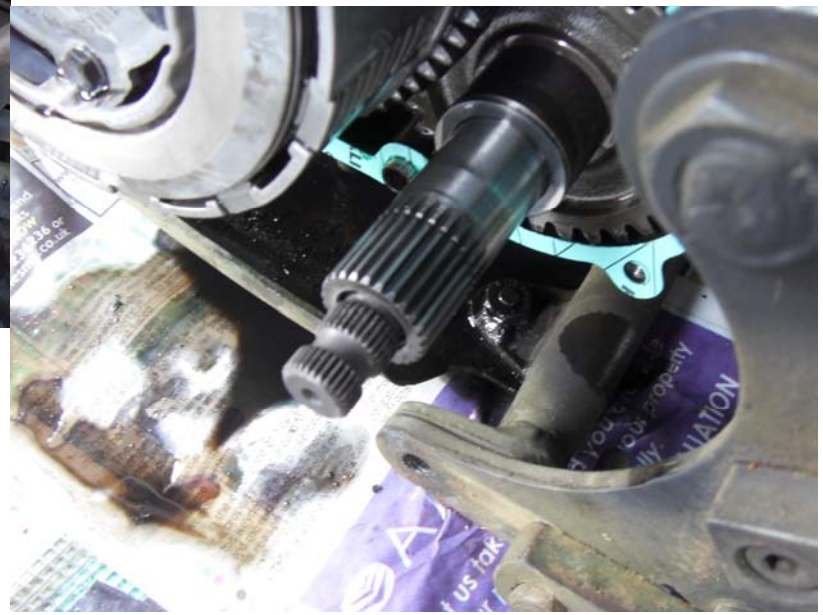
Now put the large washer on then the spring washer and us the loctite on the thread and finaly the nut do the nut up with the 27mm socket and then using a torque wrench torque the nut up to 100NM

You can see from this picture that there is some gasket left on the Clutch casing I don’t like to use a scraper so I use a wooden block and emery and go around the seal face to remove the bits of gasket

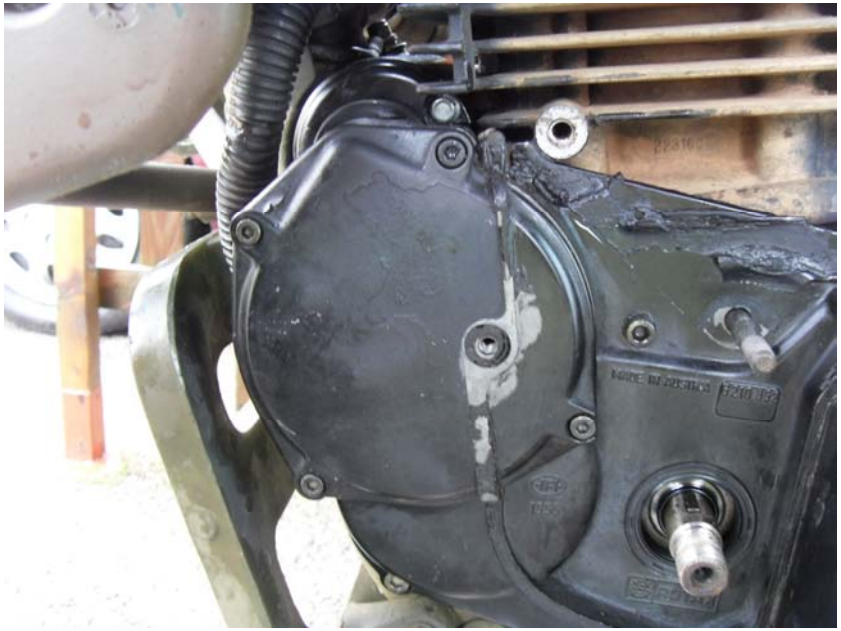
As the Clutch casing was of and the history of this bike is not to well known the oil seals were also changed the kick start oil seal (RIGHT) and the lower cam belt Pulley oil seal (LEFT)

Now the reassembly started and the gasket is put in place and all the kick-start and gear shafts were cleaned up so not to get grit on the new oil seal.

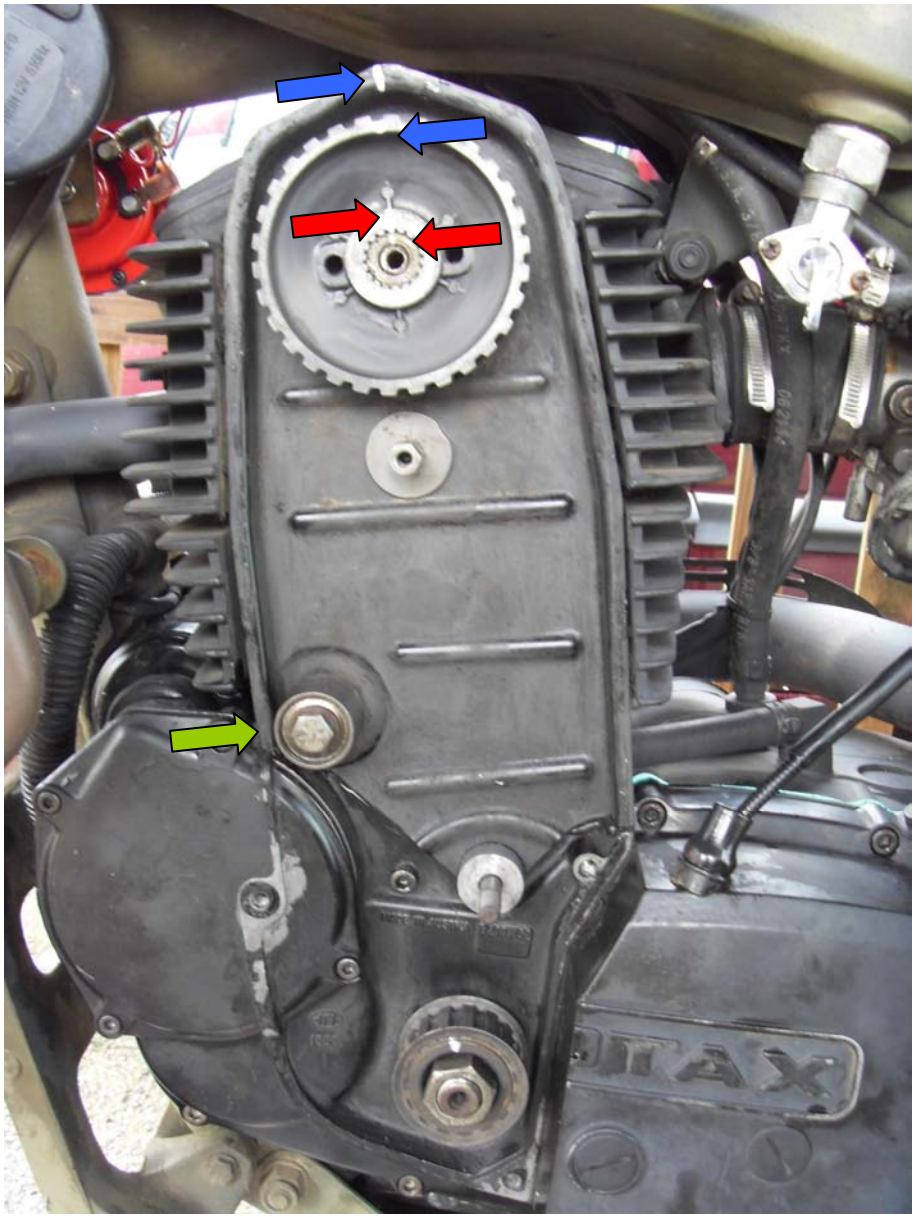




With the Clutch casing back on and tightened back up the O seal on the starter gear casing was damaged so we replaced it and then bolted it back on



When replacing the lower Timing belt Pulley there are four Keyways place it back onto the shaft with the marked keyway up as in the Picture below I have used a slightly stronger alternative to the loctite 221 replace the nut and using a torque wrench tighten it up to 100NM

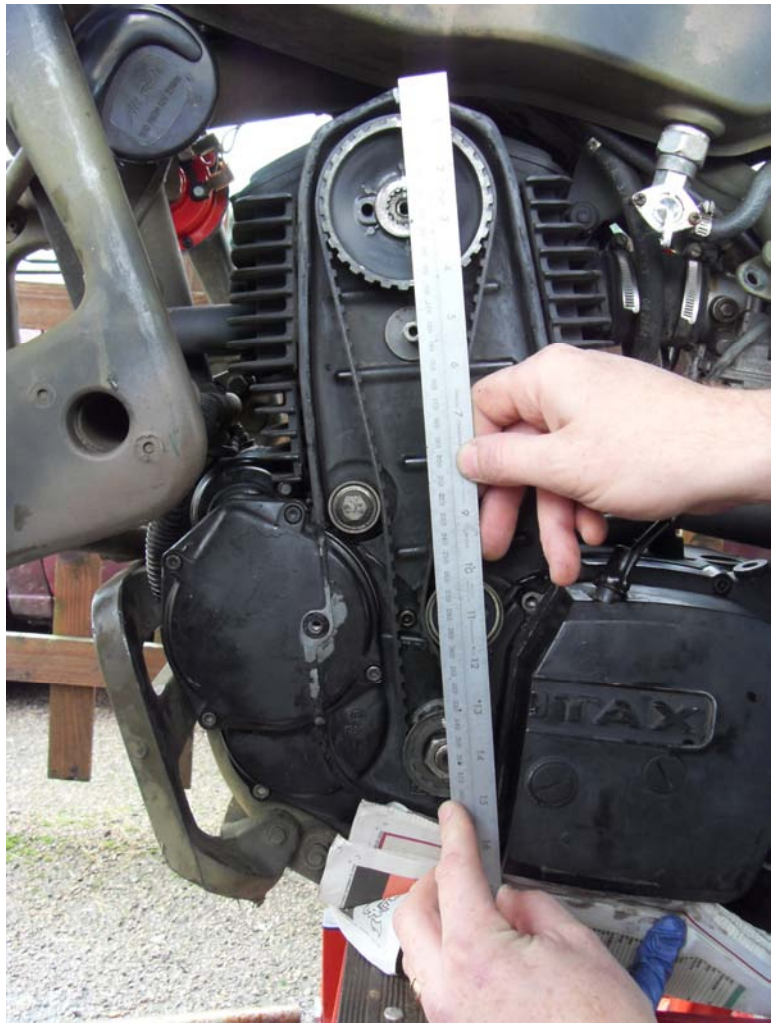


With the rear timing belt casing replaced putting the top pulley on you must alighn the two marks on the Pulley itself and the cam shaft as indicated in the Picture

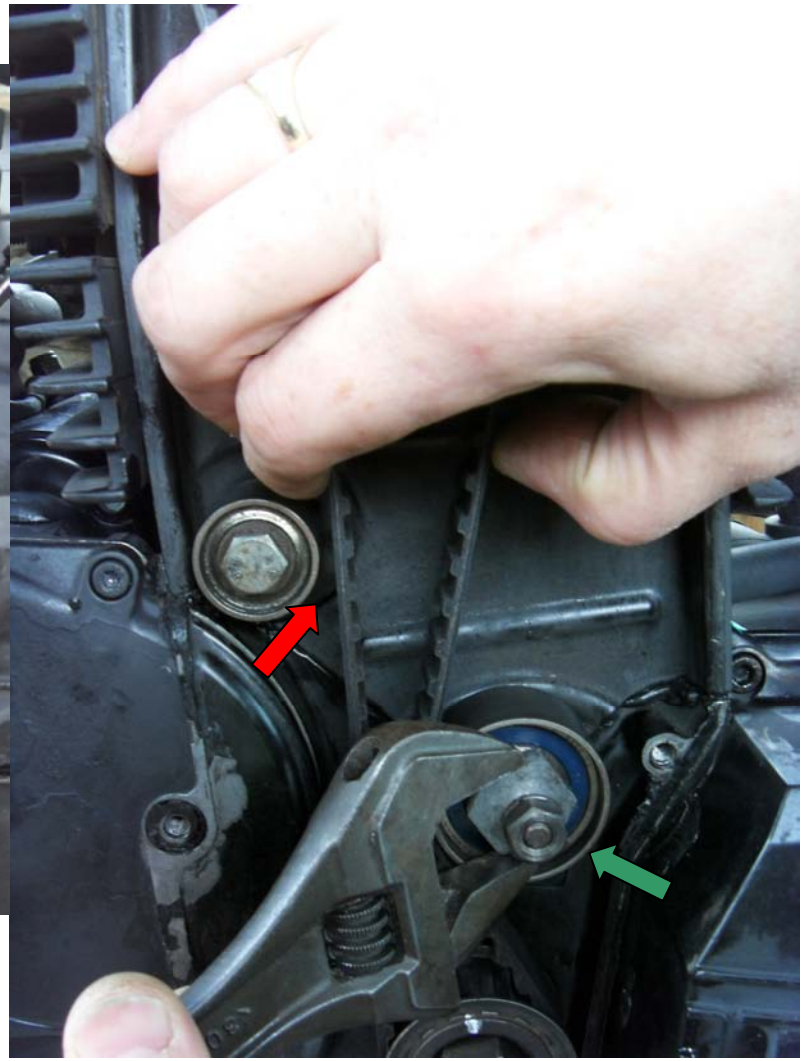
The Guide indicated with the green Arrow is just tightened up there is no torque setting for this

Also in this picture there are blue arrows indicating that the top pulley should be put to near the extra mark we made earlier in the disassembly this will move slightly when you come to tighten the cam belt

In the left the Cam belt and the Cam belt tensioner have been put back on at this point you Just put the nut onto the tensioner pulley, Then turn the tensioner until the belt it just tight and nip the nut to hold it in place check the marks all line up as in the picture on the right



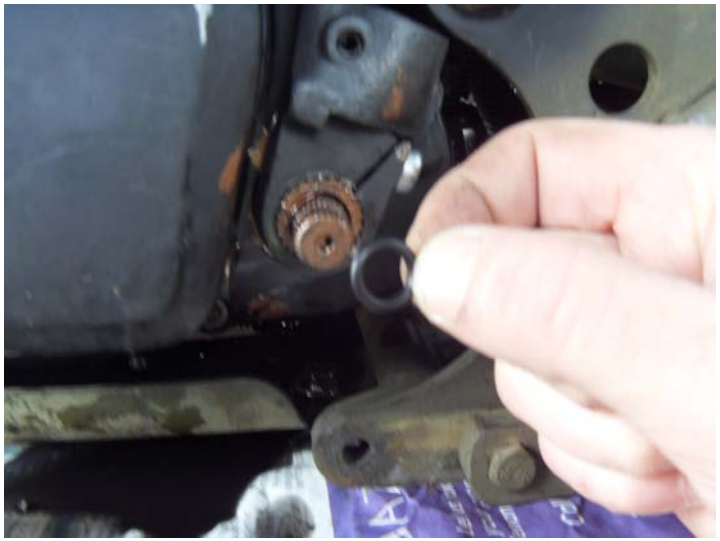
With the top pulley in roughly the right place apply some loctite to the tensioner pulley stud put the nut on and turn the eccentric tensioner until you have 6mm gap shown by the Arrow this should be with 20n of pressure but a tug in the event of not having a set of slide scales with Newton's on it will be ok
hold the tensioner in place and just nip the nut so it doesn't move, The nut then needs to be tightened to 18NM
the green arrow shows the nut in question



Now recheck your marks to see that they all line up.
At this point I like to back the Crank locking bolt out so I can turn the engine over 2 revolutions this will let you know that the belt doesn't slip from being to loose
wind the crank locking bolt back in and recheck your marks if they are out then the belt has slipped

With the timing now set and checked that the belt didn’t slip loctite is applied to the bolt for the top pulley and then tightened to a torque setting of 35NM

Place the kick-start cir clip back on to the kick start shaft and lubricate with copper slip
slide the kick start back on and tighten it up using a 6mm Allen key
now place the o ring seal onto the gear shaft



Replace the timing belt cover and remove the crank locking bolt and put the plugging bolt back in
top up the oil as required and replace the gear leaver
Turn the engine cut out switch so the engine will not start and turn it over to get some oil into the area worked on this will also test the sprag clutch
with this done start the engine and check for oil leaks