Water Pump R&R

Text and Photos By Pyndon:

OK, so here it is……..how to rebuild your water pump on the KTM 950 Adventure.

So, you get home from a long ride out and think "you know, it hasn't gone yet but I ought to do that damn water pump before it does". So you clean off your bike and get cracking. It's always better to work on a clean machine, keeps dirt from dropping in the motor while it is open to the element. It's also better to do preventative maintenance rather than waiting for the inevitable!

Well first off you need to order all the stuff you need to do the job, so here is the parts list:

1 x 60030025000 - Inside Clutch Cover Gasket
2 x 0625069010 – Grooved Ball Bearings
2 x 0770250030 – O-Rings
1 x 0760123072 – Shaft Seal Ring
1 x 60035054000 - Water Pump Shaft
1 x 60035053000 – Water Pump Gasket
2 x 0471120010 – Circlip 12x1
1 x 0472240120 – Circlip 24x1.2
Some silicon paste or light silicon grease
A bunch of tools, an oven and a few hours of free time.

So you start of by stripping the beast down. Remove any tank guards / tank bags you have on your bike and the right side tank. You also need to remove the front header pipe to gain sufficient access, to do this you may have to loosen the right hand rear side panel off (but not fully remove) to gain access to the rear header pipe clamp. With a stock bash plate remove the right side cover, with an aftermarket bash pate remove the front two mounting bolts and swing the plate down out of the way, or remove it completely.


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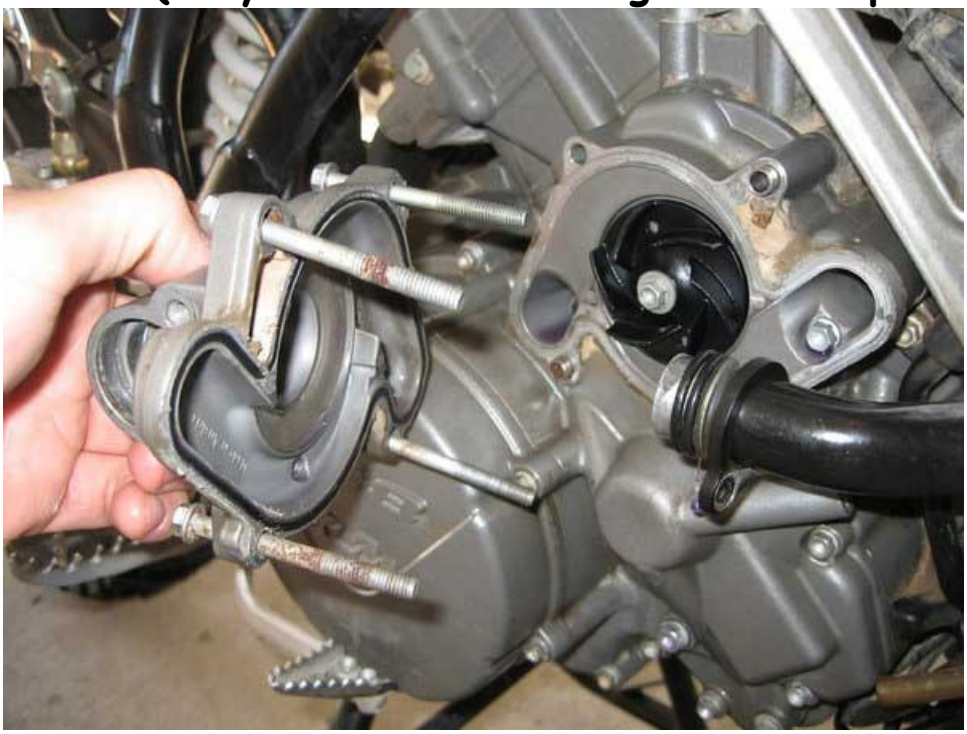
Now you need to drain the coolant, to do so, remove the radiator cap (not while engine is hot!) and the lower drain screw in the water pump housing.

You can then remove the hose connector and pull the pipe fitting from the water pump housing. Make sure remove both screws, there is one lurking underneath.

Lean the bike side to side to remove as much coolant as possible form the engine and prevent it from dripping all over you while you work on the bike.

Now remove the four water pump cover bolts and carefully remove the cover and its gasket. Be careful not to loose the two locating dowels (they remain on the engine in the picture shown).

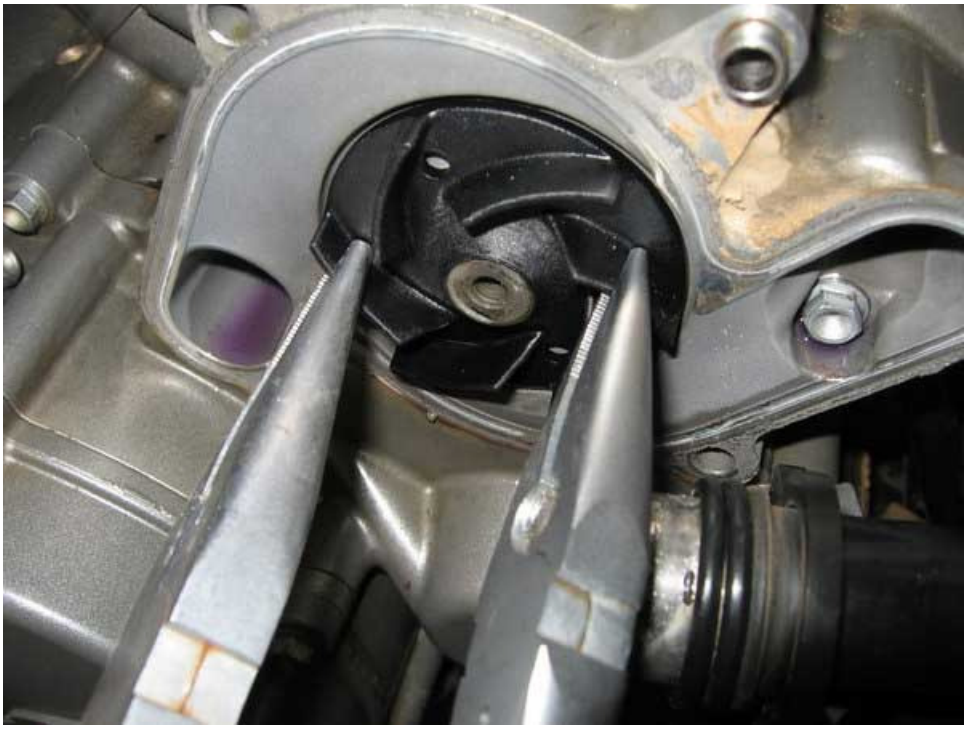


Now you need to be a little creative. To prevent damage to the water pump drive mechanism in any way, it is advisable to hold the impeller using a suitable tool. It took about a minute to make

the tool and here's how. Get some half inch flat bar of some kind (light duty is fine) and drill two holes in t to mount a couple of nuts and bolts. These should be a distance apart so they are approximately in the center of the blades on the impeller.

Unscrew the impeller bolt without applying a turning force through the pump drive mechanism. Apply the same force on the tool you have just made but in the opposing direction to the wrench.

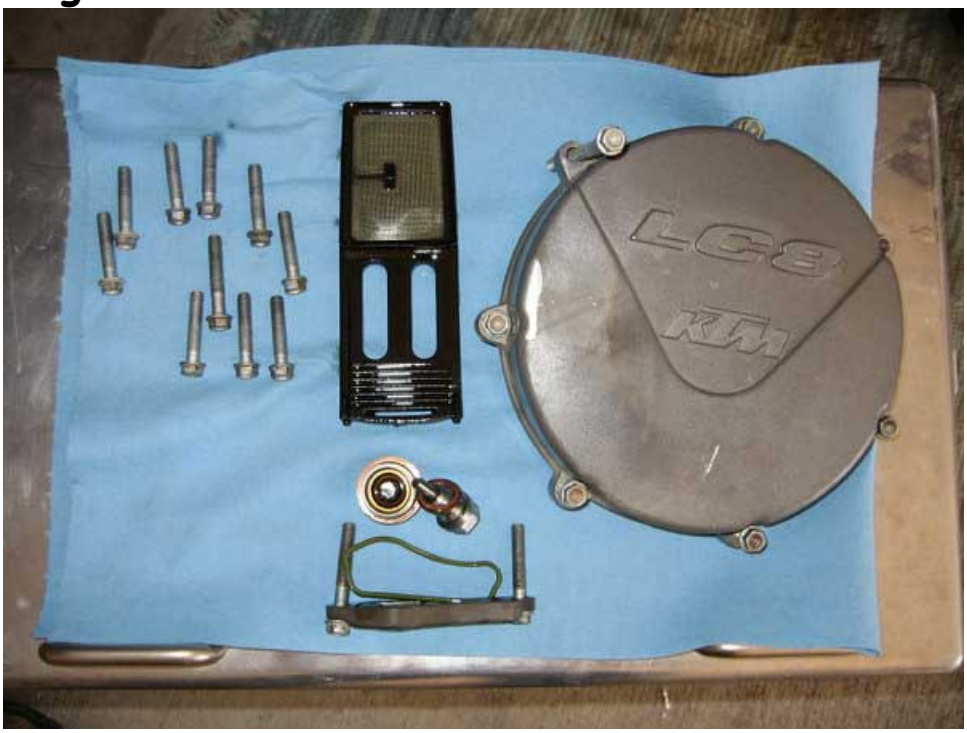
Carefully pull the impeller from the shaft without damaging it (its only plastic). It could take a little persuasion due to excess Loctite holding it in place from the previous installation.



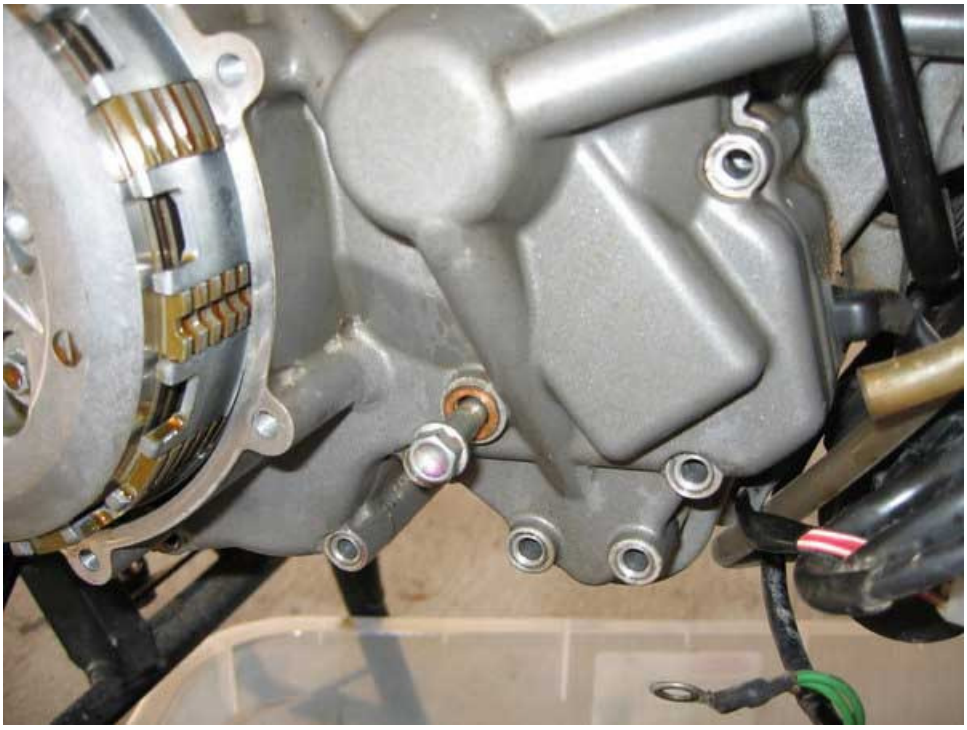
Remove the impeller and be careful not to loose the special washer that sits on the shaft behind the impeller Remove that also.

Remove the lower screen cover just below the clutch outer cover and remove the screen from inside. Note: You do not have to drain the oil to do this, the sump should only have about a cup full of oil in it, and the remainder is in the tank. Just remember to check oil level once the job is complete. It is probably a good idea to change the oil and filters at the same time as a water pump rebuild since a lot of the bike is already stripped down so you have access to all areas.

Remove all of the mounting bolts for the inner clutch cover. You do not have to remove the outer clutch cover from the inner clutch cover but one of the bolts (top left) runs through both and has to be removed. I removed the outer cover in the photos. Make a note of their positions as some are slightly different in length.



Also, don't forget the one inside the water pump (becomes accessible once you remove the water pump cover) and also the larger bolt in the center of the bolt group at the lower right corner. See picture below:



Carefully slide the inner clutch cover from the engine making sure not to loose or drop the two locating dowels in the engine. In the pictures they stay inserted in the engine side. To remove the cover fully you will need to rotate it anticlockwise as you pull it further from the engine.

Inside face of inner clutch cover:

Remove the circlip from the inner side of the water pump shaft using appropriate pliers.

Now remove the seal from the outer side of the cover. This is not all that easy so I found it better just to punch the old shaft out from the inside which takes the seal with it as it has a circlip attached behind the seal.

Compare new and old water pump shafts. This one was replaced 12,000 miles ago and as you can see it has a considerable groove worn into it from the pressurized water side seal (far right).

Take note that the housing holds two identical bearings and each only have seals on one side. The inner most bearing (first image) has the seal facing into the engine, the outer most bearing (second image) has the seal facing outwards. The bearing both exit through the outer face of the cover. In-between the bearings there is a circlip so you have to remove the first bearing and then the circlip before you remove the second bearing. Do not try to remove them both together. All three circlips within the pump shaft system are there to locate the axial position of the water pump shaft and prevent it from drifting side to side under operation.

Now comes the fun part. It is essential that you wait for wife or girlfriend to be out shopping or something for this part of the operation! Preheat the oven to around 350F. Once up to temperature plunk the clutch cover in the oven for approximately 15 minutes so it is up to 350F. At the same time place the two new bearings in the freezer for 15 minutes.

When the time is up, remove the item from the oven, WARNING: IT WILL BE VERY HOT!! Please wear suitable protection. Place the cover on a block of wood or something that will not melt. The bearings may fall out, but if not, carefully tap the outer bearing out of the cover from the inside face (evenly around its circumference). Turn the cover over and remove the circlip.

Turn the cover over again and remove the inner bearing from the cover by gently tapping it from the inside out (again evenly around its circumference).

Quickly clean the bearing bores with some lint free cloth and retrieve the new bearings from the freezer. Install the first bearing (seal side down or facing inwards towards the engine) by gently taping it evenly around the circumference of the outer race as to not get it jammed (be careful not to slip and damage the bearing). Once it gets square it should slide in freely. Ensure it is fully to the bottom of the housing.

Install the new circlip located between the bearings.

Then, install the outer bearing with the seal facing up or outwards from the engine in the same manner as you installed the first. Make sure it is fully up to the circlip.

The new seal double edged and is symmetrical so it does not matter which way around it is installed. It comes dry and remember, "never mount dry"!! So I prefer to use a little silicon paste or light silicon grease to lubricate the seal well and prevent immediate wear or damage.

Install one small circlip onto the new water pump shaft in the center position.

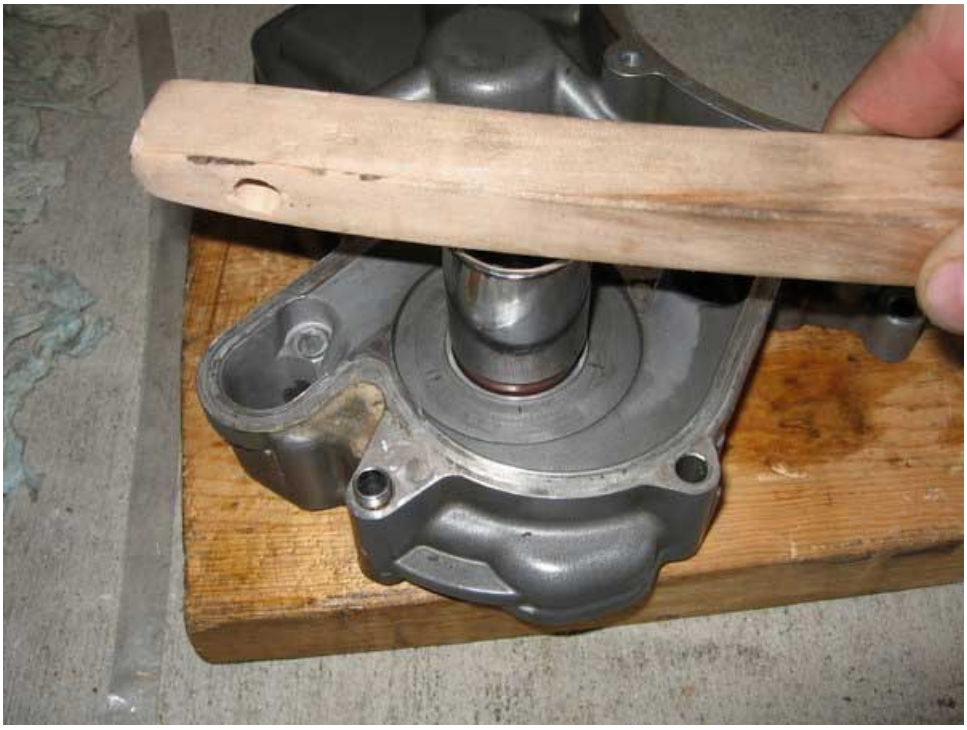
Now yet again we have to get innovative. Not having the official KTM tool to prevent seal damage upon installation I just place one run of electrical tape tightly around the outer edge of the water

pump shaft to protect the seal from the sharp features on installation.

Lubricate the shaft as you did with the seal and slip the seal onto the shaft up to the circlip.

Slide the shaft and seal assembly through the newly installed bearings from the outside of the cover.

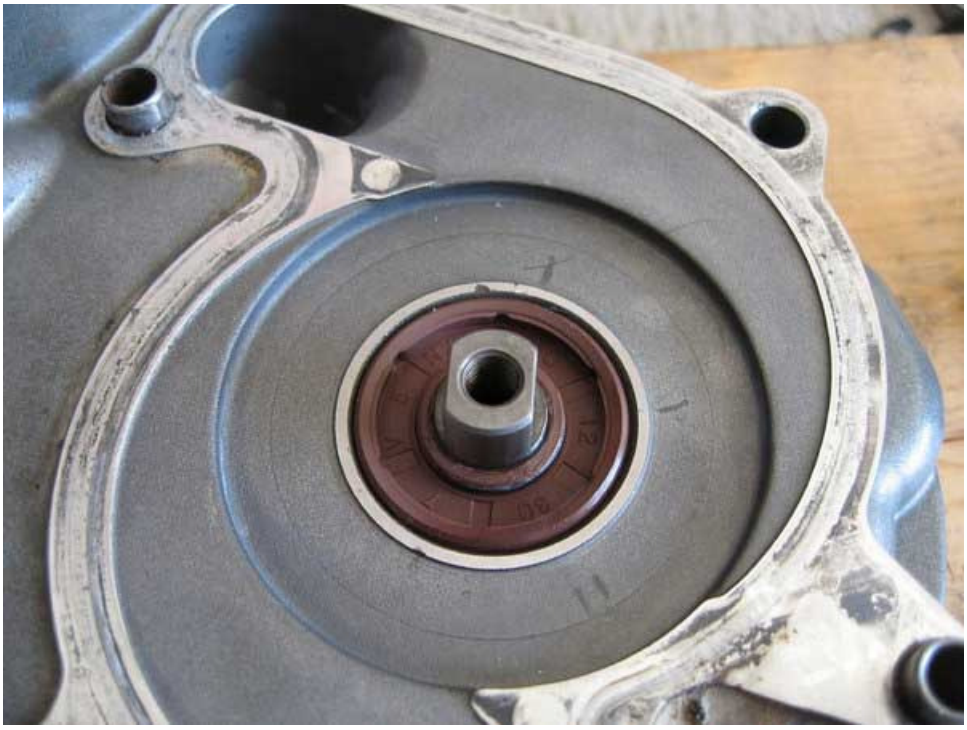
Now with an appropriate sized socket, gently tap the seal square into its housing until seal is flush with housing (socket hits housing).



Flip the cover over and install the remaining small circlip on the inner edge of the pump shaft.

Turn the cover over and remove the electrical tape from the shaft.

The new bearings, seal and shaft installed.



Clean the gasket face on the engine side and the inner clutch cover inner face thoroughly removing all remaining signs of gasket material and taking care not to drop debris into the engine or to damage the mating surface at all. Ensure all items are clean prior to re-assembly.

Install the new inner clutch cover gasket onto the two locating

dowel pins.

Install the inner clutch cover.

Reinstall all of the bolts on the inner clutch cover and the outer clutch cover making sure the correct lengths are in the correct positions. Also do not forget to connect the electrical connector to one of the lower right hand bolts.

Torque them all to 10Nm.

Reinstall the impeller being careful not to damage it.

And install the center bolt with some Loctite 243.

Using the tool made previously, locate it at a slight diagonal and torque the impeller bolt to 10Nm.

Remove the old water pump cover gasket and clean the faces thoroughly then install the new cover gasket.

Thoroughly clean the hose connector joint (pipe and housing) and install the water pump cover making sure it is located correctly on the two dowels. Torque the four holding bolts to 10Nm.

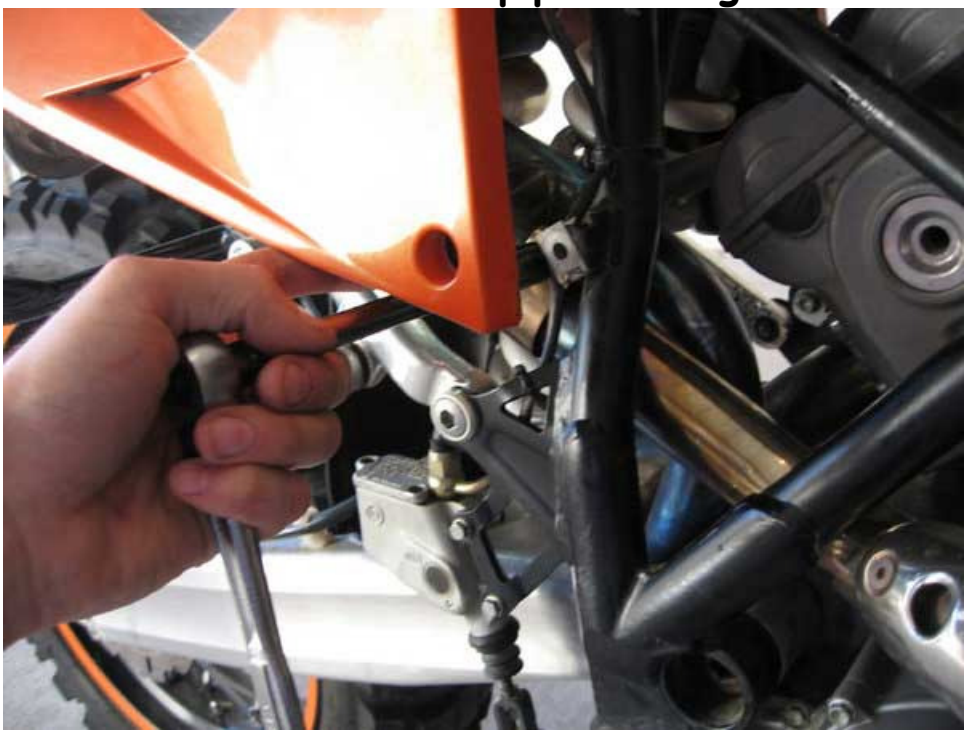
Apply some silicon paste or light silicon grease to the hose connector joint (pipe and housing) and install the new o-rings.

Reconnect the pipe and install the two flange mounting bolts. At the same time, re-install the coolant drain bolt with copper washer.

Reinstall the lower screen ensuring the 'top' mark faces up and refit the cover. The longer of the two bolts goes to the back.

Double check everything is in place and tightened up correctly.

Refit the front header pipe and right hand side panel.



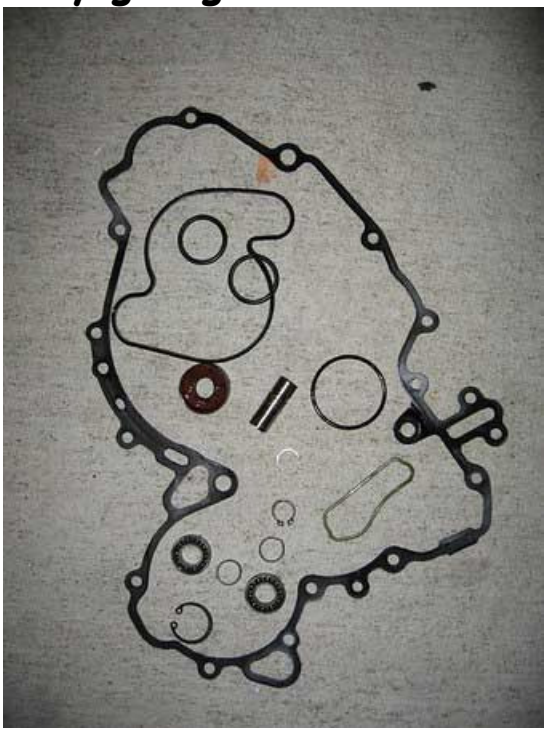
Fill the coolant system through the radiator cap until the radiator is full. This could take some time as the coolant has to slowly feed its way into the engine, so be patient. Once the radiator is full, remove the upper bleed screw in the water pump cover and bleed all the air out of the pump until fluid flows. Put the screw back and tighten.

Then remove the left hand bleed screw from the top of the radiator and top off the radiator until coolant is seeping from this bleed screw opening. Replace the screw and fully top-off the radiator and install the rad cap.

Make sure the expansion tank has the correct level (between max and min), adjust accordingly.

Button it back together and away you go. Don't forget to check your oil level since you will have lost a cup full.

Tidy garage and throw away old parts.



Hope you find it useful.

Cheers

Pyn