

I must thank Frank from Offroad 80's for this excellent writeup.

[How To Top up your FAN CLUTCH and do the Blue Fan Clutch MOD](#)

Hi,

As most of you may be aware, I have been doing a lot of research lately on our cooling system in the 80's including the fact that we have a dead spot on the OEM temp gauge which prompted me to not rely on that in terms of deciding if my cooling system was still healthy.

As a result of knowing that there is a Pesky heater host at the back of the motor that goes and causes a lot of overheating problems that sometime result in head gaskets and major engine repairs, I had all of my heater hoses replaced - I mean after 14 years of a well maintained car - they can not and don't last for ever. I also had my Fan Clutch replaced as Preventative Maintenance at the same time(135,000K's) because they apparently are shot by 160,000k's. Fan clutches apparently don't generally just stop working - they work less and less efficiently over time, then with the temp guage deadspot, you don't notice it until it is that inefficient that the deadspot on our temp gauge is overcome by extreme heat.

I also had my radiator looked at, it was still the original OEM which is Brass Core with Plastic tanks - it has signs that the radiator tanks could give up soon, so I ended up having it replaced with a Brass Core with Brass tanks - this should last even longer *fingers crossed*

Then after all of this, I decided to overcome the temp gauge dead spot by installing one of these temp gauges - [Click here for info on the Digital Temp Gauge with ALARM](#) - which then caused me a little concern as my temps were 5-6 degree's higher than other friends and people with the same car.

As a result of further research, I found out that the NEW Toyota Blue Fan Clutch which I had, was found to be set differently from one unit to the other and that they also had different amounts of oil.

There is hence three things you can do - add oil, adjust the temp that the clutch begins to engage, or do both.

I have only added and removed oil - which seems to have solved my problems - it definitely has brought the temps down to where it should be and it is definitely behaving the way it should be - ie. engaging at higher temps and cooling the engine better when the engine revs are raised - it wasn't

doing that from new. I am still doing testing however - need to test it owing my 2.5T boat. Towing a Jetski, it tests okay so far.

The Genuine Toyota Blue Fan Clutch is one of the very few that is ADJUSTABLE - however the original one, I am advised can be topped up with oil no problems.

Now, I had a mechanic remove and top my fan clutch up with 2 Tubes of oil from Toyota - this is what Toyota advise people to do.

When I got it back, I found the temps had come down but the fan seemed engaged a LOT - I am judging this by the noise it was making.

As I have had the car from new, and I have never heard, nor do I recall the fan being that loud, I decided that as these clutches are coming with differing amounts of oil and settings, to remove ONE TUBE of oil - ie. 18 mils. This means I effectively have added ONE TUBE of oil to my fan clutch from the factory amount.

I did this using a syringe.

This for me seems to be perfect right now - I want to test it towing a 2.5T boat - then I will say that for me - one tube was perfect or not.

I will also add that when adjusting the clutch timing which I will detail how to do below - there is a way to put what has been determined the correct amount of oil - I am not sure where this is in relation to my clutch because it requires you to leave your clutch overnight to drain the oil which I didn't have time to do. From the research I have read, one tube seems to be what it takes to get it to the correct level.

Here is the instructions on how to top up the oil and do the mod in regards to adjusting the temp which the clutch locks up.

READ THE WHOLE THING BEFORE ATTEMPTING THIS.

To do this, you will require the following tools

One or Two-Three Tubes(TWO or possibly Three Tubes(Third Tube just in case) if you are doing a full empty and refill, start with ONE if you are just topping up a new clutch) of TOYOTA Fan Clutch Oil available from Toyota Dealers

Loctite 242

#3 Philips screw driver

#2 Philips screw driver or impact driver may be needed.

12mil 12pt RING SPANNER

10mil 12pt RING SPANNER

Socket wrench for undoing the Fan Shroud bolts

It is preferable to use a TORQUE WRENCH to tighten up the nuts on the Fan Clutch Hub that is suitable to 40 Nm of Torque

warning: None of the parts within the clutch are serviceable by TOYOTA. Be gentle with that O-Ring. If it appears to have stretched and there is a bubble when placed in the groove, simply start from the side opposite the bubble and work it back into place compressing it as you go.

If you are doing the adjustment of the clutch then you will need a BBQ ROAST thermometer like this one below:



First we must remove the clutch from the car.

First undo the FAN Shroud - this is the big plastic cover on the back of your radiator. This took a bit of manipulation to move it towards the engine with the top radiator hose in the way a bit.

Next, undo the 4 x 12mil bolts holding the clutch hub and fan assembly on. This can be a pain because they are TIGHT. The nuts are very SOFT - I used a 6mm FLANGE Spanner - however I recommend you use a 12pt RING spanner (DEFINITELY NOT 4pt) as they WILL BUR EASILY. 2 of mine were already burred by someone previously so I am going to replace them this week.

Lift the Fan and clutch assembly carefully out - you may have to manipulate the fan shroud a bit so you don't damage the radiator fins with the fan assembly.

It will look like this:



Once it is out of the vehicle, now remove the 4 FAN nuts so that the FAN and Clutch can be separated - These nuts are ALSO VERY SOFT - again - 12pt 10mm ring spanner is a must in my opinion - they are also very tight.

If you need to get replacement NUTS - the thread sizes you need are 8 x 1.25 mm and 6 x 1.00 mm, the Toyota nuts are flange type in both applications.

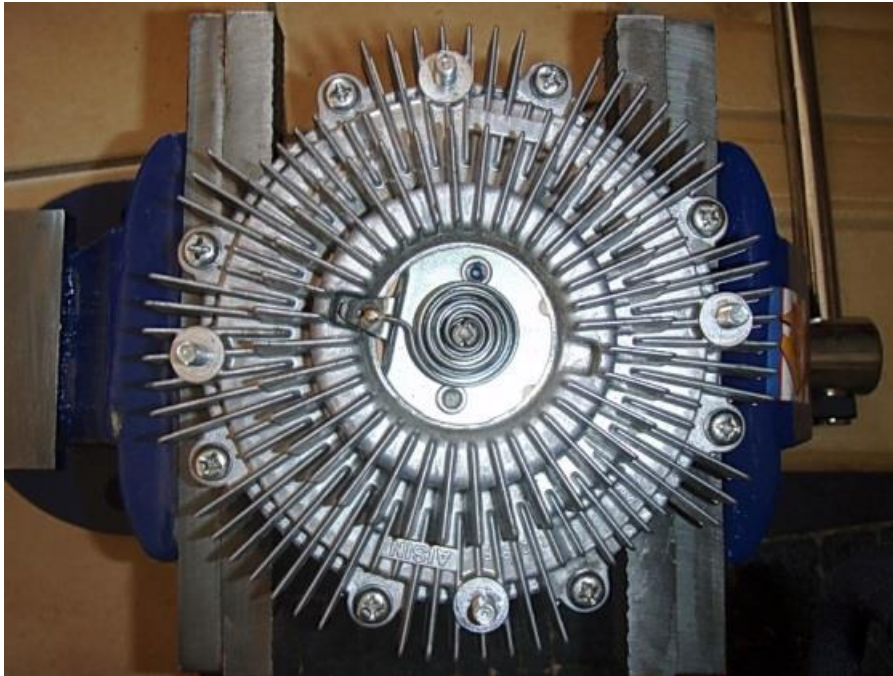
Now that your fan is off the clutch, it should look something like this:



Here it is with FAN removed and the hub side facing up



Here is it with FAN removed and the hub facing downwards - this is the side that faces the radiator - the thermo you can see there is what senses the temps from the radiator and progressively locks and unlocks the clutch.



Before disassembly of the clutch, clean the outside of the clutch completely so no debris will enter it upon opening it up

Now you need to REMOVE those 8 screws above so that we can separate the two halves of the clutch.

Again - these SCREWS like the previous nuts are SOFT - make sure you pick the right sized Phillips head screw driver for the job and take your time. Some people have totally burred screws and had to resort to dremel tools etc. to get them out - mine were fine though - keeping in mind that mine was brand new and had already been apart once before. Some people recommend using an IMPACT driver to get them off if the clutch has been on the car for a long time.

To do this I placed my clutch assemble on a Vice carefully not to damage the fins on the clutch - YOU MUST HAVE IT LEVEL when you do this, or oil may spill out.

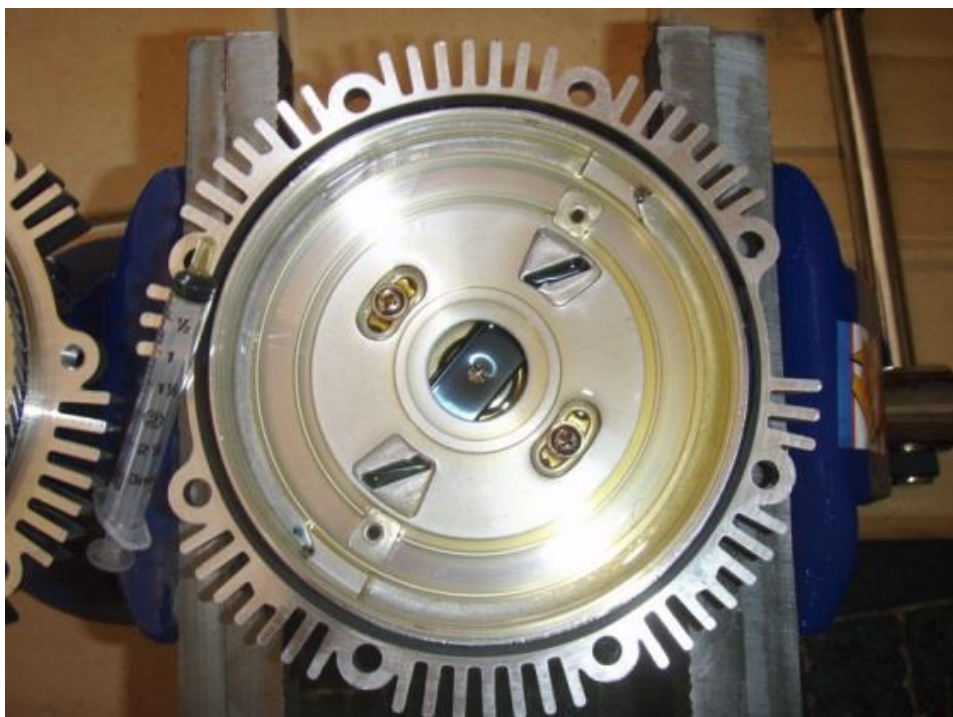
Once these screws are removed, you can then carefully separate the two halves but before hand, you will notice a slight vaccumm as you slide them apart, you should have the Thermo sensor shown in the previous pics facing DOWN which means you flip the clutch over after you remove the screws before actually pulling it apart. This is the side that contains most of the oil from what I found.

It will look like this:

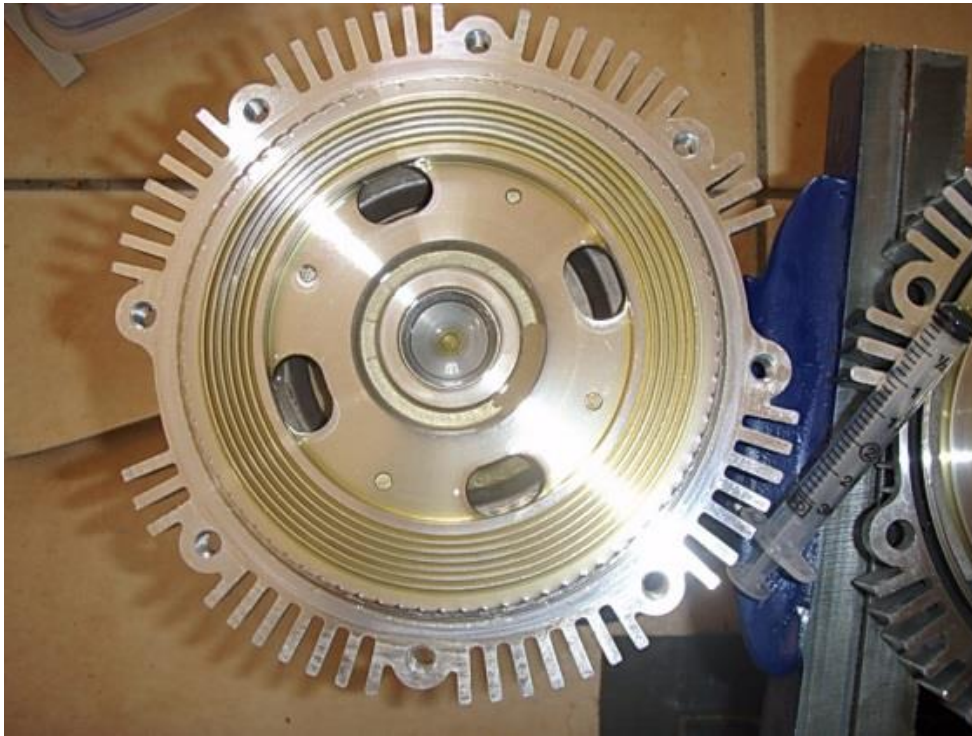


Here are some close ups of each side once opened up.

This is the side I top up and remove oil from which has the reservoir which has the thermo sensor facing downward.



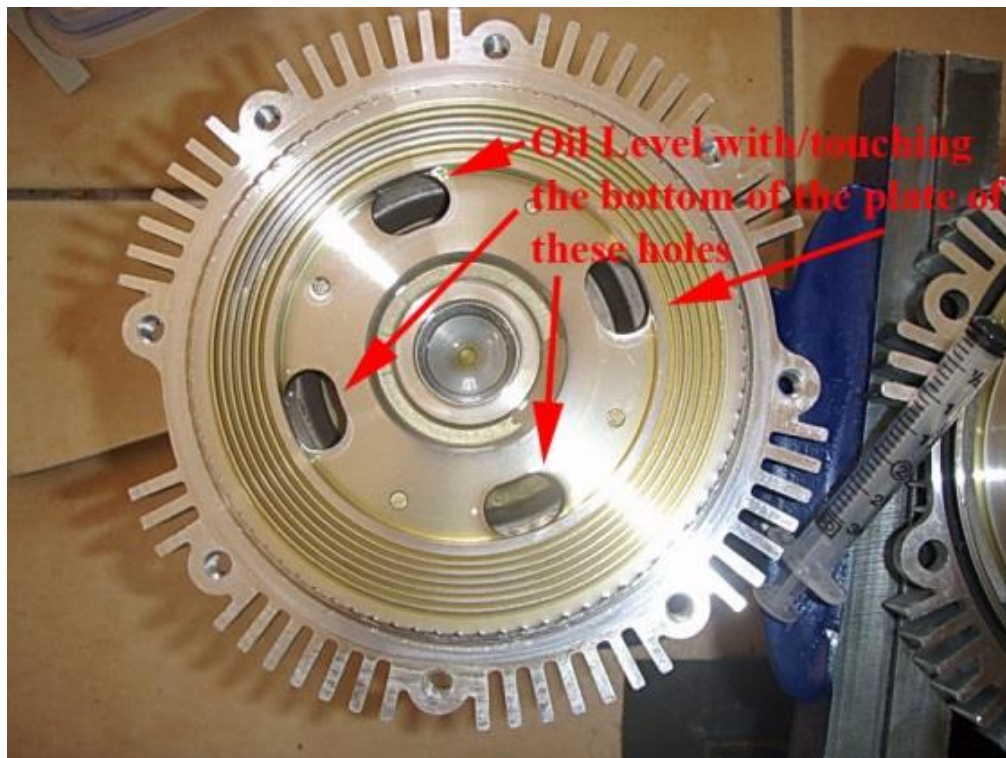
Here is the other side which has the hub side facing downward.



Now, it's time to ADD oil.

I recommend first trying adding ONE TUBE - this seems at this point in time, just right for me. If after towing I find different in the next week or so, I will edit this.

Some people recommend when doing the Adjustment of this clutch, that the oil level is filled after ALL oil is drained out over night (to drain ALL of the oil as it is very thick) and that two full tubes from an EMPTY CLUTCH will bring it up so that the oil is level with the bottom of those holes you see in the pic below



I believe two tubes to be accurate because Toyota say - if your clutch has leaked all of your oil out, then to add two full tubes.

This means you have to put the clutch HUB side down overnight BEFORE SEPERATING BOTH HALVES, then put that Half in a container after separating the halves for another overnight stint to drain it all out.

Some people say that placing the parts on rack of some sort with a catch pan and put in an oven at say 150 degree's F goes along way in getting that stuff to drain more completely out of the base since that side doesn't come apart is a faster way than waiting over night....

I didn't have 24 hours to wait before needing the car, so I effectively added one tube to the factory fill as my mechanic had not drained it overnight either when he added two tubes so there was probably 18 mils(one tube roughly) in there already when he added two tubes. What I did - was use a small syringe to remove exactly 18 mils. I am telling you this, so if anyone overfills and it locks up too much, this is how to accurately remove one tube or whatever you want.

Then we need to re-assemble if you are not modifying the clutch timing.

Now replace the top of the clutch and tighten down the screws. If the O-Ring has come out of it's groove you'll need to work it back into place. The easiest thing I've come up with is to start from the opposite side and work it in by compressing it together. Once it's in place it will stay there during reassembly.

The torque spec that I've come up with for those screws is: Good and tight - being careful NOT to BURR the screws - remember to use Loctit 242 - now you need to put the fan on and install it back into the car.

To do this, do everything in reverse using locktite 242(according to the FSM) on all bolts and screws. Again - use a 12pt ring spanner on the nuts!

When putting the fan and clutch assembly on the hub, the FSM states to do them up to 40 Nm of torque.

Now, if you want to go one step further and modify the timing as this is ALSO APPARENTLY DIFFERENT ON EACH CLUTCH - apparently, they engage at anywhere between 105 degree's F to 125 degree's F. The ideal temp is apparently 95 degrees F. Apparently only one in 8 brand new clutches opened up were set correctly at 95 degrees F.

The modification involves, a few additional steps... first involved sitting the clutch whilst both halves are still together before removing the 8 screws overnight with the HUB side down to ensure all oil goes into the oil resevoir and then after you remove all 8 screws, and Adjust the Clutch, Remove all oil by sitting both halves upside down in a container overnight so it can ALL pour out - we will get to that after we adjust the timing.

Now, put the half of the clutch which has the thermo sensor on it into a frying pan with the thermo side down in water(1.25 inches of water in a sauce pan to make sure just the thermo sensor is completely covered but not allow water to bubble into the inside of the clutch) and heating it on a stove until it gets to 110 degree's F using a thermometer like the one pictured below.



Once it hits 110 degree's F, place the pan with the clutch in it on a wooden board which helps slow the process of cooling down. Since the pan with water in it will cool at the edges faster than the center where the spring is at, it's important to occasionally lift the clutch up and down to help circulate the water and minimize that effect do this every few minutes and then more frequent when you get closer to the target temp of 95 degree's F.

Here's a pic :

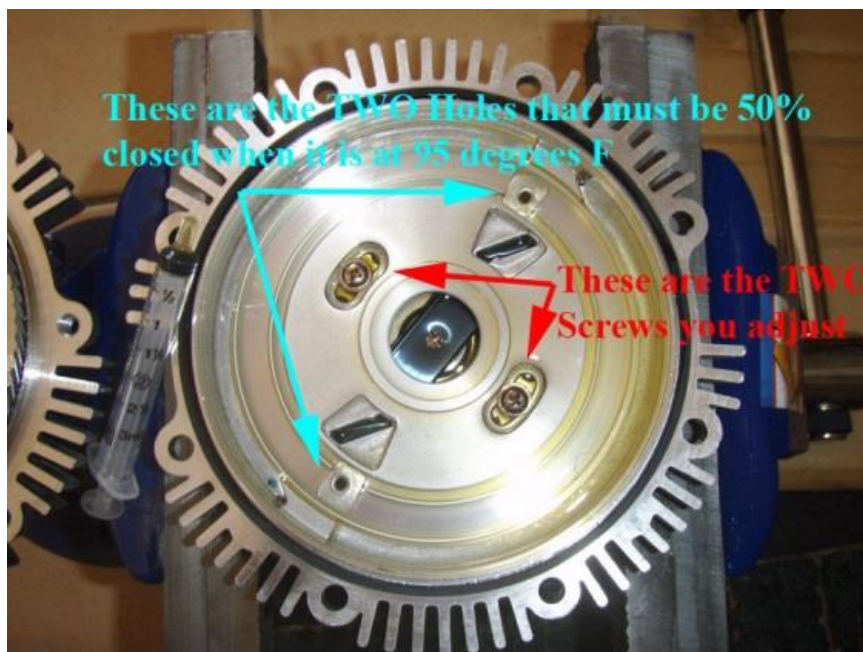


Loosen those two screws and adjust it so that when you look straight down and the TEMP on your thermometer is at 95 degrees F, the two ROUND holes are half closed and then tighten up the two screws - Let me explain...

You'll need to sight throw one of the small round holes and adjust the plates position so that half the hole is open and the other half is blocked by the valve.

If the holes don't align perfectly to each other one should be 50% open and the other should be more than 50% open.

This must be set when the temp is 95 degree's F.



Personally, after this was set, I would heat it up again, remove the clutch from the pan and wait for it to come down to 95 degree's F and make sure it is set correctly. I would also out of my own curiosity have heated it up to say 125 degree's F and taken note what temp it was originally set at - so if I wanted to go back - I would know where to go.

Now remove all oil by sitting both halves upside down in a container overnight so it can ALL pour out. This will take a few hours minimum, overnight would be best.

Once the clutch is empty, fill the HUB to the underside of the drive plate. Looking through the holes in the plate you'll see some rectangular reliefs that will help you in determining when you've reached the underside of the drive plate. Empty both tubes completely into the clutch and it should be the right level.

You'll want to add oil to all the holes as this stuff is pretty thick and doesn't flow easily.

Now you can reassemble as per above.

At this stage, I have not needed to adjust the temp that it kicks in. I will see what happens when I tow a 2.5T boat on a hot day - hopefully weather will permit this week end.

Keep in mind that to make sure that your temp are correct, you really need to have an accurate temp gauge on your cooling system to be able to see BEFORE and AFTER results - as the OEM gauge will hide any irregularities if your temp is not up near boiling point but well and truly out of the normal range - therefore I recommend you install either a mechanical type gauge in your top radiator hose or a lower cost, easier to install and just as accurate one of these which also has the added benefit of an audible alarm which you can set if the temps go out of the normal operating zone before your OWM gauge starts to move giving you more warning to take action should something in the cooling system fail. - [Click here for info on the Digital Temp Gauge with ALARM](#)

Just realised that I never followed up on this post of mine.

The results were great - The engine temps are now stable when towing as well as driving around town...

If you are having issues like I was - I recommend at least replacing the oil with the correct amount and then if you are not happy, checking the adjustment as well.