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Workshop - TD5 Water Pump Replacement

There comes a time when things just give up, mechanical things simply do wear out and the water pump is just another one of them. The water pump can fail in a few ways, the seal between the cover and pump can leak, as can between the pump and the accessory drive casting.....also though the internal bearing of the pump itself can also fail.

Now because of where the pump is fitted, if the bearing fails the water has to be allowed to escape, this is performed by a weep hole / drilling in the accessory casting that allows the water to escape externally instead of "building" up behind the steering pump. The water pump is actually driven by a keyed "wheel" which engages onto the rear of the Power steering pump which is in turn driven by the auxiliary belt.

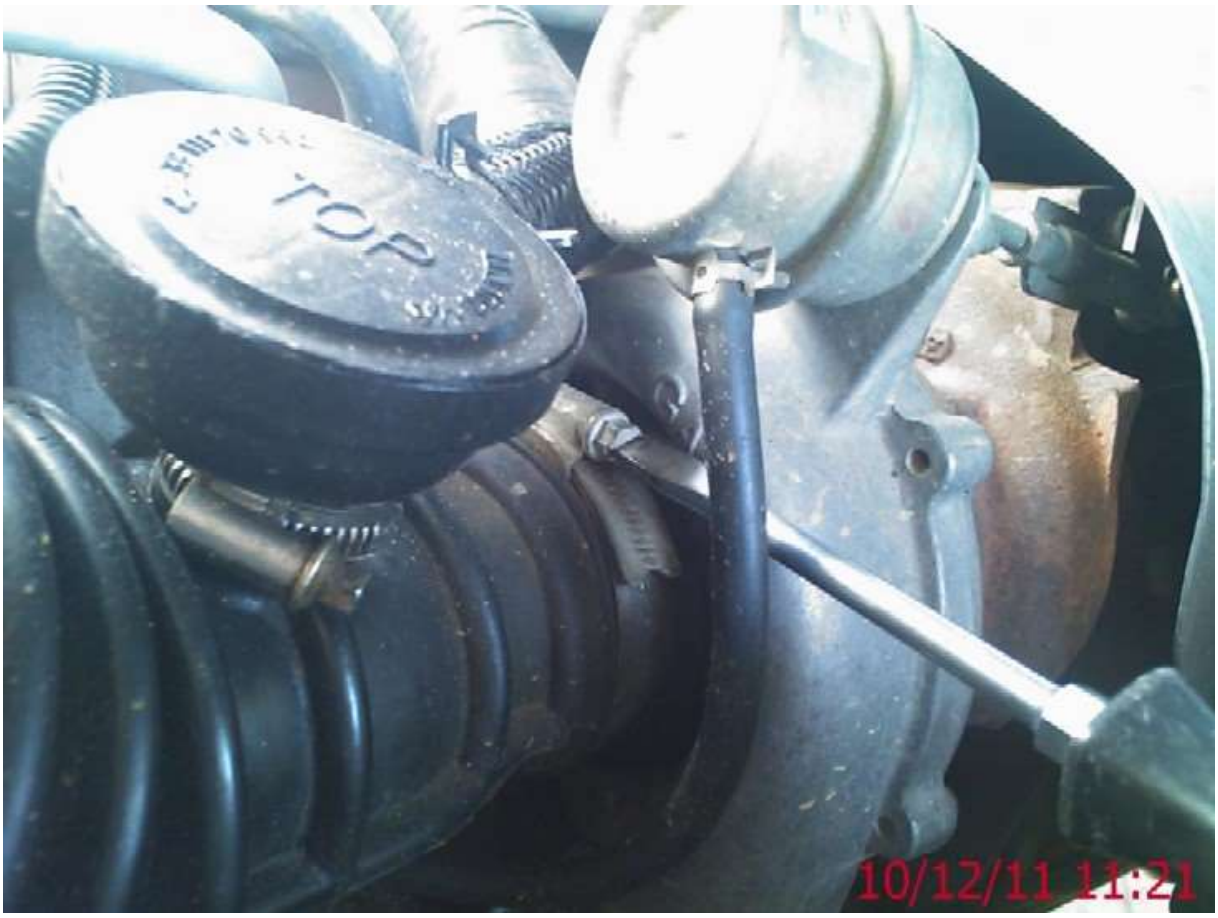
Replacing the pump is a fiddly task with not a lot of access available, so some "ideal" tools are needed to complete it as in this write up. You can off course remove more items if you so wish to give you more access, but this is how I do it below.....

First of remove the engine acoustic cover...

Next, undo the clips that hold the MAF sensor to the intake tube...and unplug the MAF sensor loom...

Next you can either just "pop" the waste gate tube out from the intake hose, or remove the clip and pull the small tube of the white angled connector..

Once that's disconnected, undo the jubilee clip from the Turbo...



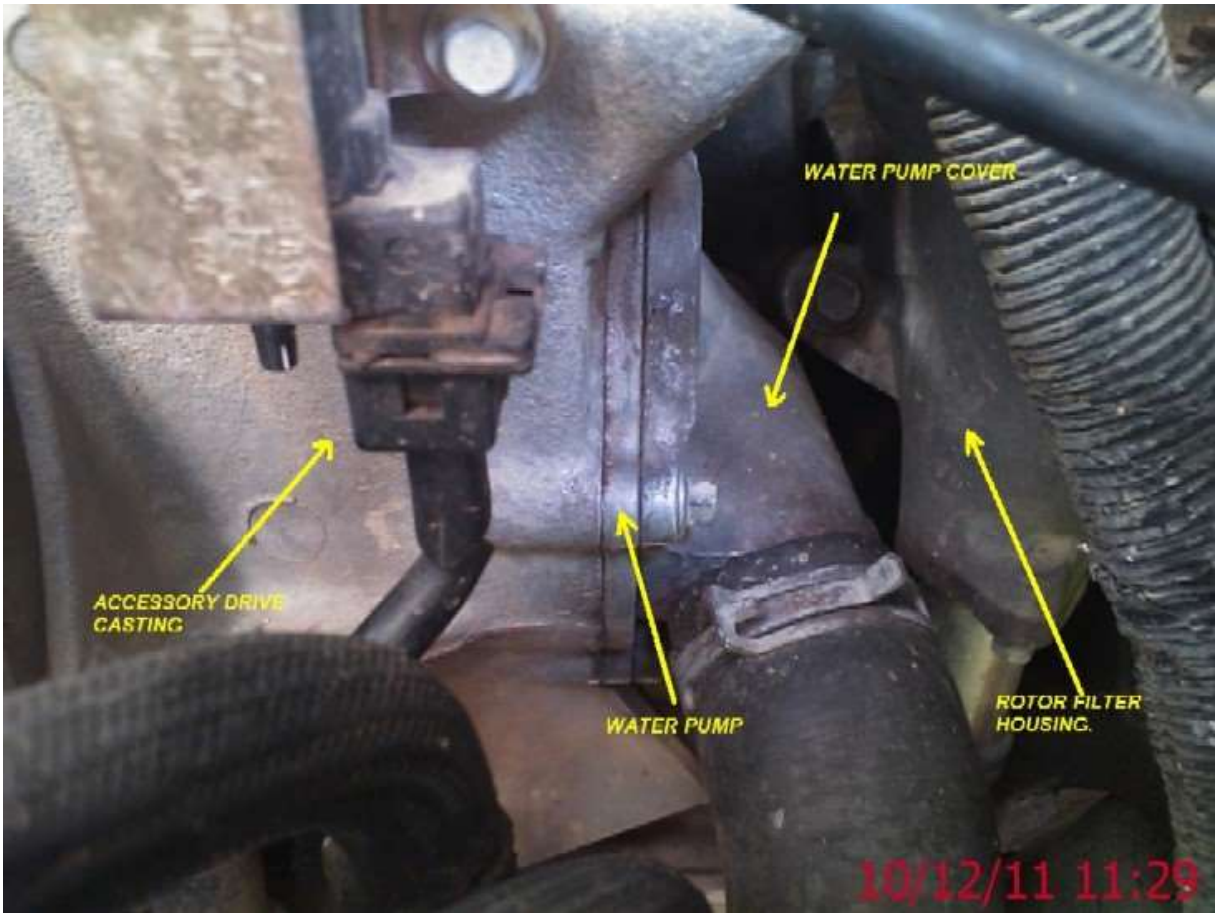
And move the whole intake tube out of your way.....

Next we need to remove the metal intercooler intake tube, so disconnect it at the turbo end.....

And then the intercooler end.....

And finally the small tube that runs to the waste gate actuator controller. You can disconnect that at either the intercooler tube or off the bottom of the modulator, your choice.....vehicles without ACE have a little more room to work in.

Now we have to gain some more access as the rotor filter housing is in the way where it is, the workshop manual states to remove it completely, I don't feel this is necessary....below you can see where the pump is housed and the proximity of the rotor filter housing, you can get the cover off the water pump with this amount of room but the pump itself will not come out....

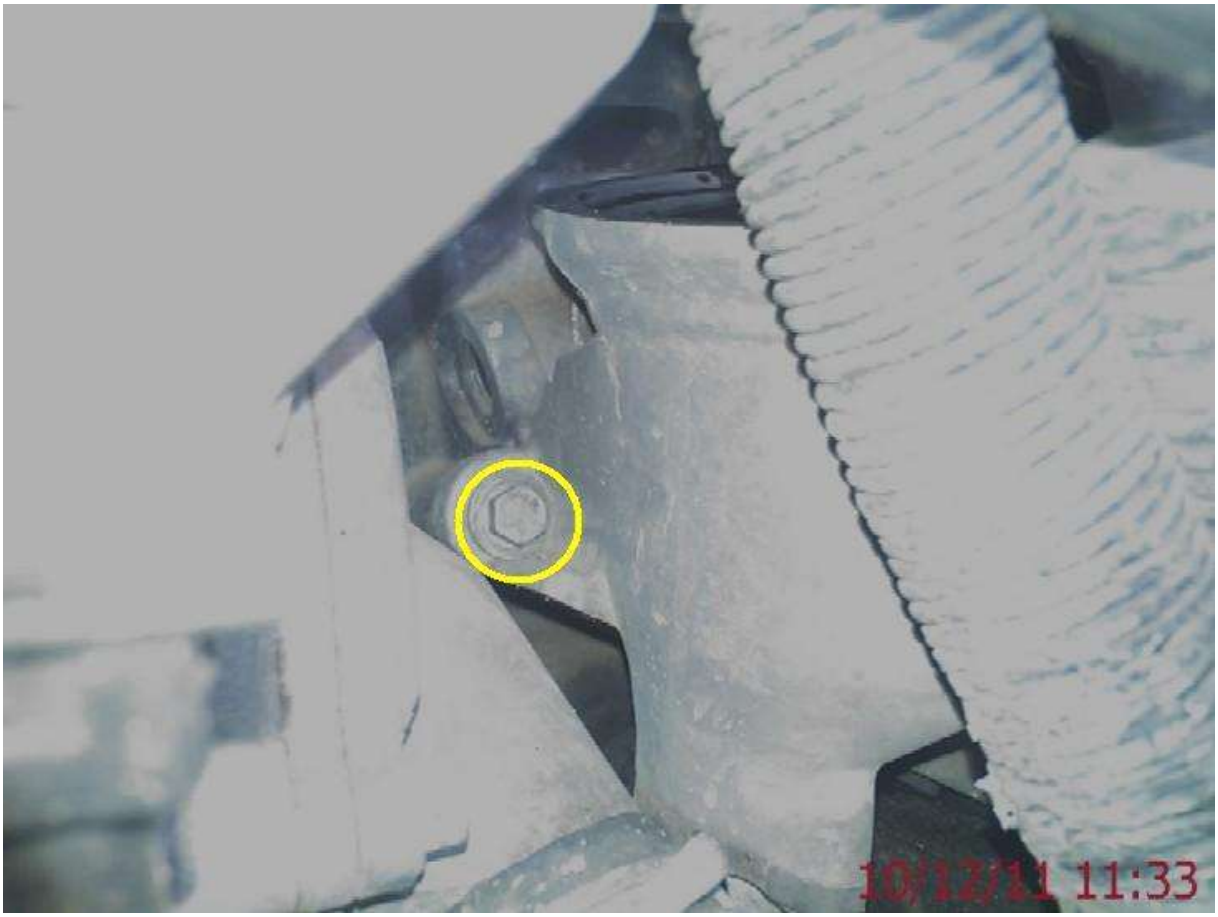


So to gain some more room, we have to next remove the rotor filter....If you have completed a filter change before, then this is straight forward enough.....undo and remove the 2 cover plate retaining bolts....

Then remove the filter and store in a clean container....

As you can see in the picture above, the housing is very close to the turbo oil feed pipe (top corner) and we need to move the filter housing rearwards to get the pump out, but also need to be able to undo and remove the turbo oil pipe banjo to allow the housing to actually go rearwards....

The rotor housing is held by 3 bolts.....one below....



And 2 to the rear on the other side of the housing.....because of my second battery install its more difficult to see them, but on vehicles without one you should see them easy enough...circled below...

However.....to get to these bolts you will need to also remove the standard engine oil filter as well...Details of that procedure are here :- *TD5 Oil Change*

Filter pictured below...

Once the standard filter is removed, you can then simply use a 3/8" ratchet, extension and 10mm socket to get the rotor housing bolts out.....they "may" be quite tight, so make sure you are square on them before attempting to undo them. The use of six point sockets is recommended.

Take note of the bolt positions, 2 are the same length (the lower rear and forward ones) and the upper rear one is a lot shorter, use a magnet on a stick to remove them if you cannot get your hands in there..

Now you will see / feel that the rotor housing "flexes" or moves about on its drain tube, you can off course remove the whole assembly by also undoing the drain tube at either the bottom of the housing, or from the engine oil sump.....be aware of draining oil if you choose to do that.

So we can now "flex" the housing forward and get a 14mm spanner onto the turbo feed hose...

Undo that hose and be CAREFUL not to drop / lose the copper washers, it has one either side of the banjo fitting.. you will probably find once its "cracked" you can wind it by finger pressure only.....the washer may well be stuck to the housing, but keep an eye on it....

Turbo oil feed hose banjo removed (above), one washer stuck under the head still and the other from the housing side.. Once removed, then flex the hose up and clear of the rotor housing..

In the picture above, you can also see a "peg" or step on the casting just next to where the feed hose goes, the rotor filter housing will now "flex" down and rearwards "Under" the peg, not much but it's enough to continue with the water pump removal.

Now before we actually loosen the pump, we need to drain the cooling system, to do that there is a handy drain plug fitted into the lower coolant rail. To get to that you will need to remove (if its fitted) the small plastic trim that covers it just above the steering damper..

With that panel removed, you will see the coolant drain plug.....these are often very tight and may even be already rounded off by a previous attempt to remove it. If it is still in good shape, again use a six point socket and extension to "crack" it off.....

If your drain plug is to tight, or already damaged you will have to drain the coolant by removing a lower radiator hose. This then will make it more difficult to keep the coolant clean and collect it for re-use as it will run all over the dirty chassis etc. If this is what you need to do I would then strongly advise you collect it as best you can, but dispose of it properly and renew the coolant upon completion of the pump replacement..

If you plug however does come out, then it is possible to feed an good sized funnel up onto the steering damper / drag link and if you funnel has a handle it will sit / hang below the plug quite nicely. You can then remove the plug and drain the water directly into a clean container, a washing up bowl is plenty good enough in size to catch the amount you will drain..

NOTE *:- the drain plug does have a washer / seal, it may stay either stuck to the rail or come with the plug, just be aware.....Also, the coolant will not flow freely once you removed the plug as it has to take air in to allow it to flow.....so making sure you funnel is secure, go to the expansion tank and SLOWLY crack the cap off, you will be able to then see / hear and control the flow into the bowl....draining the coolant in this way will make no mess and enable its re-use.*

Right, once the flow has slowed enough, remove the cap from the expansion tank and leave your bowl and funnel in position to catch any more coolant that drips when you "break" into the water pump side of the system. It is not possible to catch all teh coolant that will come out when you remove the pump, so place another container below the coolant pump, a large drip tray works well.....

Right we can now attack the pump itself, first off remove the hose directly onto the pump cover....

This will allow more coolant to drain from both the drain plug and from this hose...

Now its time for the pump cover itself.....it is held on by 5 x 8mm headed bolts..

4 of the bolts are circled above, the 5th bolt is just under where the hose connects to the cover...Now this is where tooling is important, THE most handy tool for this job is a 8mm ratcheting spanner.....

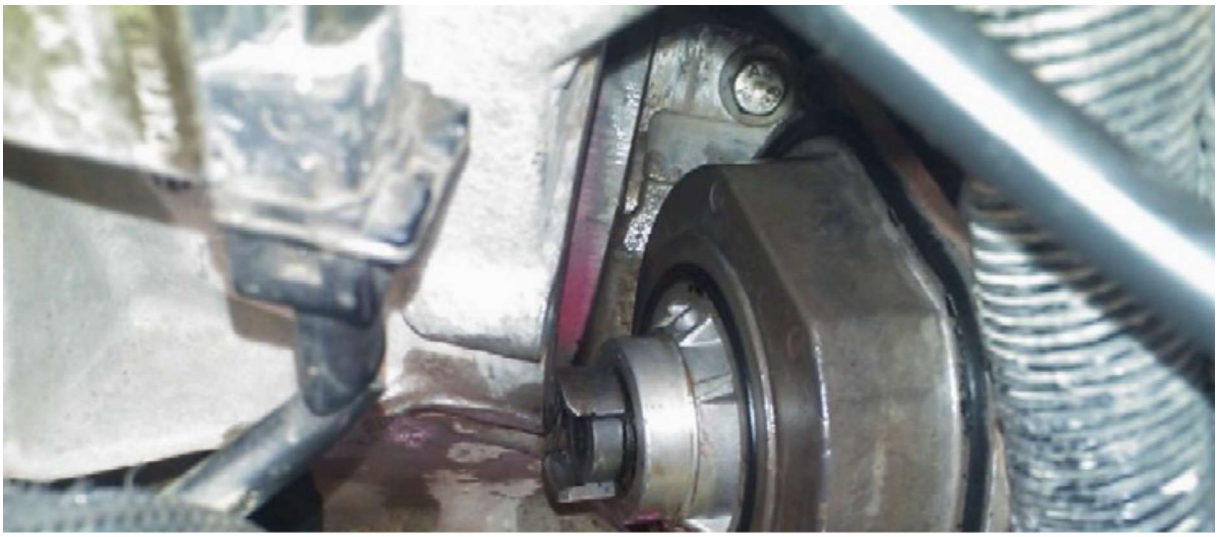
If you don't have one of these, then either get one, or remove the rotor filter housing completely to allow access with other tools...

This spanner will allow easy access to remove all the bolts....the bolt closest to the engine block is the most difficult to access, but the spanner can be fed up from underneath to access it if you cannot get on from the top...

I have quite skinny hands so access from the top and bottom is possible for me, you may find one way is easier than another, but I cannot stress enough how much easier it is with this type of spanner.. Once all the bolts are removed, you can then remove the pump cover..

This reveals the water pump.

*The cover retains the pump as well, so the pump is now free to be removed, be patient with it and take **NOTE** of which way you remove it as will assist you in feeding the new one back in again....*



You can see how tight space is from the above picture, flexing the rotor housing forward and down and rotating the pump a bit will allow it to come out. BE CAREFUL to not jam it and damage the face of where it sits on the accessory casting. It will be the drive wheel that interferes the most, but take your time and manipulate it out.

Old pump above, the "weep" hole in the pump shows evidence of coolant leakage...the holes line up with the holes / drillings in the accessory casting seen in the picture below...

You can also see the power steering pump drive wheel that "keys" into the water pump to drive it.

Now its time to put the new one in, but before so give the 2 machined faces above in the accessory casting a good clean with scotchbrite or fine wet and dry as they are the "sealing" faces of the water pump. TAKE CARE to not leave any bits of rag or paper in there whilst doing it, and also be careful as some of the un-machined edges of the casting are quite sharp.

Also clean up the water pump cover inner face and especially the hose outlet of any build up of lime scale / corrosion as it will cause the hose to leak..

Cover mating face and hose outlet cleaned up.....To refit the new pump, I use some "o" ring grease and give all 3 seals a light smearing to assist it when fitting the pump to the casting and the outlet cover to the new pump..

The seals are "bonded" to the new pump, I have seen "Pattern" parts where the seals have already started to come away from the pump assy, so it would pay you to buy a good quality OEM or even Genuine pump. I used a Quinton Hazel pump which is the same as Land Rover used.

When fitting the new pump, again manipulate it gently into the housing (hope you remembered how you go it out!!), the pump has a unique shape so make sure its orientated correctly for the 5 bolt holes to line up.....You must also make sure the drive key on the pump lines up correctly with the one on the back of the power steering pump, the water pump will not sit correctly if the drive keys are not aligned, you will also be able to rotate the pump impeller as well to aid your fitting, take your time it can be fiddly!!..

***NOTE** :- the new pump will not push directly straight back into the casting as the edge of the pump body will catch on the bolt arrowed below...*

*This is where careful manipulation of the pump will help get it re-fitted correctly.....once in refit Fit and Start **ALL** bolts by hand on the cover and tighten the bolts to 9 NM or 7Lbsft .*

Using a magnet on an extending stick will help place the bolts into the holes on both the water pump cover and the rotor filter housing. Refit the turbo oil feed pipe banjo taking care not to drop the copper sealing washers....

Continue to refit all the other items removed including the :-

The rotor filter housing bolts need to be done up to..25 NM or 18Lbsft.

engine oil filters x 2

Intercooler hose (metal) and associated waste gate tubing,

Intake hose and MAF sensor / loom.

Engine acoustic cover.....AND

Most importantly the coolant rail drain plug!!!!!!!!

Refit the lower plastic under body trim....

Now continue to refill the coolant tank with either the collected coolant or new stuff, it will drain down after a few minutes, continue to fill until it settles at the full mark. Then refit the cap and unclip the coolant tank from its mountings, you can manipulate it of its home carefully.

*Next remove the bleed screw from the top radiator hose.. raise the coolant tanks as high as it will go and continue then to refill the expansion tank until coolant flows from the bleed screw in the top hose.....Refit the bleed screw **DO NOT OVER TIGHTEN** it is only plastic.....*

Refit the coolant tank, start the car and check for any obvious leaks. If all is good, ensure all tooling etc is removed from under the bonnet and take the vehicle for a drive to get it up to temperature (temp gauge central) Ensure the heater is also set to high.

Either during or upon return from your test drive, check again for any leaks. Once the vehicle has cooled COMPLETELY i.e. overnight, then before using it check and top up the coolant again as required.