

# MiTo Full Cambelt Service (1.4 TB)

Many of us service our own MiTos, but that is typically oil and filter changes, possibly some brake pad and disc changes and other relatively simple tasks that do not need the car up on ramps.

But a full service, including changing the cambelt and water pump, is not something I would personally risk doing myself. But the team at Autolusso Bournemouth, who have done all the tricky stuff on my Alfa Romeos for many years, allowed me to spend the morning with Jack Ealey who was doing a full cambelt service on my 155TB, so I want to share the steps with you so you can see what is involved and make your own decision.

In truth, having seen the level of experience, time and care that goes into this type of service, I certainly intend to leave it to professionals like Jack at Autolusso Bournemouth, and even if you never try this yourself at least you will have some understanding of the work involved, so you perhaps will understand the prices charged by a good Alfa specialist or dealer: it is not a quick task and takes a lot of experience and tools.

I should point out that the service starts with a very detailed check of virtually every component of the MiTo, with thorough checks of all electricals, structural, suspension, brakes, pipework and safety of the car, including a test of the brake fluid for water content. This results in a full report and any advisory information for

future works or items to keep an eye on. The service also includes replacing the pollen filter in the MiTo cabin, but that's for another time as it is impossible to photograph somebody else doing it with the limited space under the glovebox.

So this article focuses on the five key tasks: air filter, oil change, spark plugs, cambelt and water pump. This applies to all petrol 1.4 MiTos (though the air filter differs on the non-turbo). If you have a MultiAir, be sure to include a change of the MultiAir filter/gauze which is detailed in our Useful Info section of [mitoregister.com](http://mitoregister.com).

## 1. Replace Air Filter

The simplest task is to replace the air filter. Depending on your MiTo, you may have a jubilee clip or a CLIC-R hose clamp holding your air intake pipe to your airbox. If it's a jubilee clip, simply undo this with a screwdriver. If you have a CLIC-R clamp like the pictures (pic. 1.1), you can ease the clip off with CLIC-R pliers or by lifting with a flat-bladed screwdriver.



Gently prise away the air pipe from the airbox (pic. 1.2). This can be a little fiddly but do not be tempted to use force – just ease it off by pulling in different



directions and up and down.

As part of the service, we will be removing the air pipes anyway, but to change the air filter you can simply remove the airbox lid. The airbox has four screws which all need to be removed, enabling you to remove the airbox lid completely. The left side of the lid has three small plastic hinge-type parts which feed under the gaps of the lower airbox.

The existing air filter can be withdrawn from the airbox (pic. 1.3) and replaced with the new



filter. Ensure the lips of the new filter are pushed down and sit snug on the surface of the airbox opening.

Now tighten the four screws holding the airbox lid to the airbox, ensuring all are aligned and

the airbox lid is tight (it can be a struggle initially with a new filter, so persevere gently).

## 2. Engine Oil Change

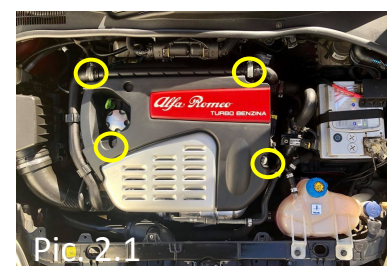
Changing the engine oil requires several steps. It is not a difficult task but it can feel difficult when doing on your drive with your MiTo up on axle stands. An important point for doing this yourself is the safe and legal disposal of used engine oil. It is illegal to dispose of engine oil in the sewerage system and used engine oil must be captured in a secure container and disposed of at your local council household recycling centre.

### 2.1 Remove Oil Cap/Engine Cover

Firstly, remove the oil cap.

On MultiAir engines, the engine cover simply pops off of the three mounts (two at the front, one at the rear).

On 120/155TB engines, there are two bolts and two hoses (attached with jubilee clips) attached to the engine cover which must be removed prior to being able to lift the engine cover away (circled below in pic. 2.1)





## 2.2 Remove Undertray

The undertray protects the engine and components from road debris. The undertray is secured with numerous cross-headed screws which must all be removed (the number of screws is likely to vary based on how old your MiTo is and how many screws have been lost!).



Pic. 2.2

## 2.3 (Optional) Remove Reinforcement Bar

The oil can be drained from the MiTo with the reinforcement bar in place, but oil tends to splash and rebound off the bar, so depending on the receptacle you have to catch the oil, you may consider unbolting the off-side bolt and loosening the near-side bolt to swing the reinforcement bar out of the way.



Pic. 2.3

## 2.4 Drain Oil

The oil drain plug is at the rear of the engine sump. Ensure you have a receptacle underneath the vehicle to catch the oil, then undo and remove the 17mm sump plug enabling the oil to drain from the car (see pic 2.4 at the top of the page).

## 2.5 Remove Airbox/Pipework

The oil will take a few minutes to drain fully, so use the time to remove the airbox and connecting pipework. This creates space to work around the cambelt but also makes removal of the oil filter much easier as it is

hidden low down at the front of the engine.

**Note**, you can skip this step if you are not replacing the cambelt as you can access the oil filter with the pipework still in situ (it is just slightly difficult to do it blind).

Begin by removing the breather rail which runs along the top of the engine from the air intake to the oil segregator, then remove the air intake and connecting pipes by disconnecting at the turbo and the air filter box arrowed in pic. 2.5(a). Note, on the 120/155 TB engine, unscrew the air intake at the front of the engine bay, but on MultiAir engines there is a small 10mm bolt below



the air intake pipe (image below).

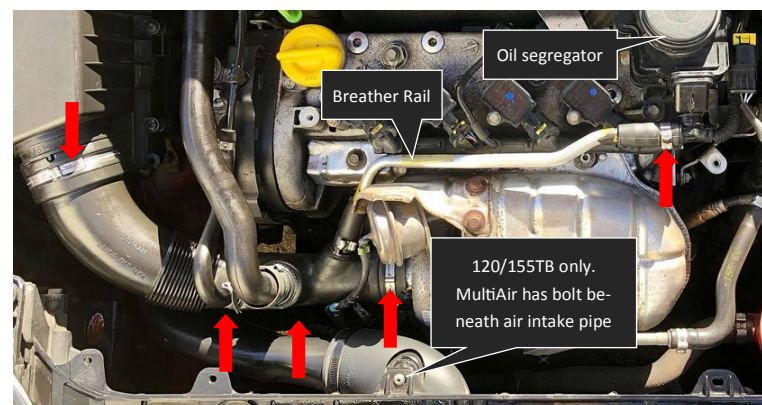
All hoses are held with either CLIC-R or jubilee clips and are quite straightforward, but you may wish to take a few pictures with your smartphone in case you need to refer to them later when you plumb the pipes back in. Note there is a small hose arrowed in pic. 2.5(b) which has a single-use/sacrificial clamp. Yours will either have the original clip or may already have a cable tie fitted. In any event, you will need to use a cable-tie when you re-fit the air pipes.

## 2.6 Remove Oil Filter

The oil filter housing is hidden quite low at the front of the engine and needs to be removed with a 27mm socket.



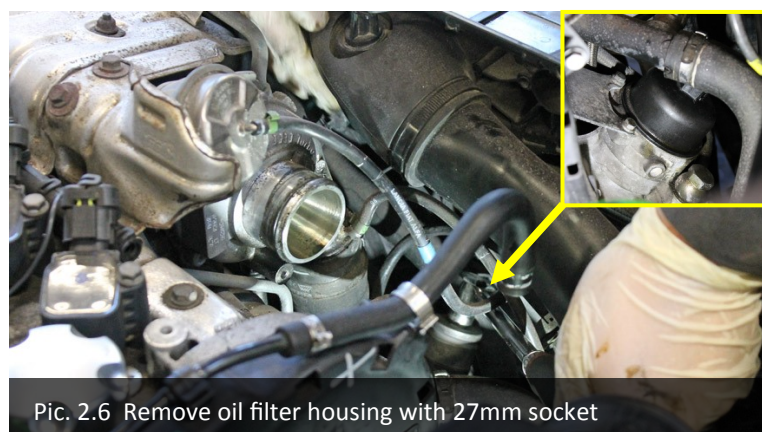
Pic. 2.4 - Oil drain plug at the rear of the engine sump



Pic. 2.5(a) Remove breather rail, air pipework and airbox



Pic. 2.5(b) This hose has a sacrificial/single use clamp and needs to be replaced with a cable tie when re-fitting



Pic. 2.6 Remove oil filter housing with 27mm socket



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## 2.7 Refit Drain Plug

Fit a new sump plug washer, then re-fit and tighten the sump plug (pic. 2.7a).



Then clean the area to remove any oil spillage (pic. 2.7b).



## 2.8 Fit New Oil Filter

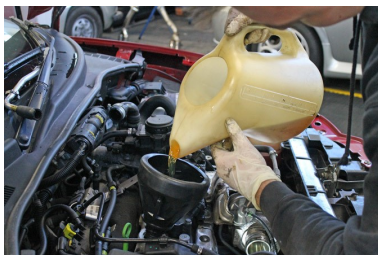
Fit the new oil filter in the filter housing cap and apply a new sealing ring to the housing cap (pic. 2.8). Then fit the new



filter and housing back into the engine by hand, then tighten with a 27mm socket.

## 2.9 Refill Oil

Refill the engine with the correct amount of the correct grade of oil (see the Definitive Oil Guide in the Useful Info section of our website, [mitoregister.com](http://mitoregister.com)), then refit the oil cap firmly.



## 3. Change Spark Plugs

It is important to understand that the four spark plugs are hidden beneath the four ignition coils, all of which are connected with the coil rail (wiring) which has five electrical plugs and an earth wire which all need to be disconnected (see pic. 3).



### 3.1 Disconnect Coil Connections

The five coil connectors (circled in pic. 3 at the top of this page) are removed by sliding the small yellow connectors then unplugging the connections. Disconnect all five plugs (pic 3.1).

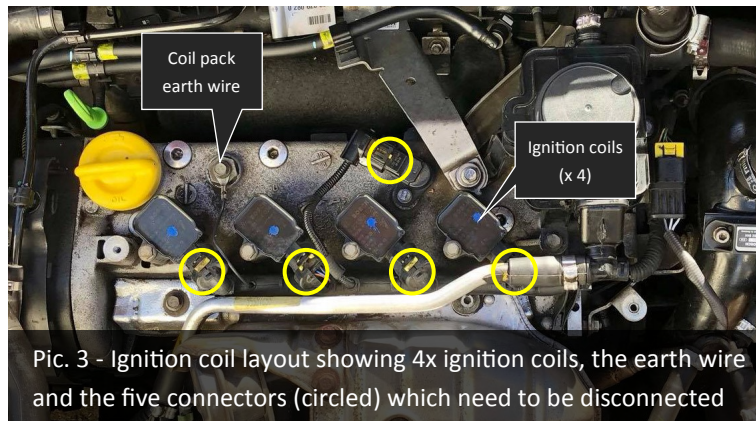
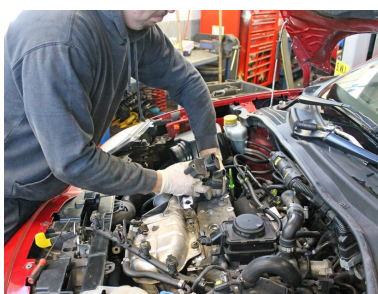
### 3.2 Remove Coil Earth Wire

Unbolt the coil pack earth wire (pic 3.2) then move the coil pack wiring out of the way.

### 3.3 Remove Coil Packs

Unbolt and remove each of the 10mm bolts retaining the four ignition coils (pic. 3.3).

Each of the four ignition coils can now be gently removed from the top of the engine revealing the recesses for each of the four spark plugs.



Pic. 3 - Ignition coil layout showing 4x ignition coils, the earth wire and the five connectors (circled) which need to be disconnected



Pic. 3.1 Disconnect all five coil connections



Pic. 3.2 Unbolt and remove the coil pack earth wire, then the entire coil wiring loom can be moved frontwards out of the way



Pic. 3.3 Unbolt the four 10mm coil pack securing bolts and gently remove each of them from the top of the engine



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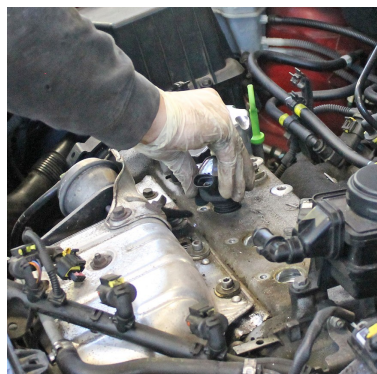
## 3.4 Remove Spark Plugs

With the coils removed and the coil connections moved frontwards, the spark plug recesses are now visible (see pic. 3.4 at the top of this page).

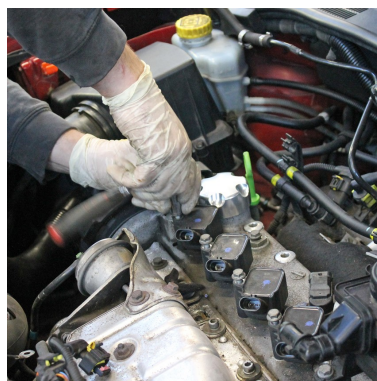
Using a 16mm spark plug socket, gently remove each of the four spark plugs and withdraw them from the engine.



firmly attach to the spark plugs).

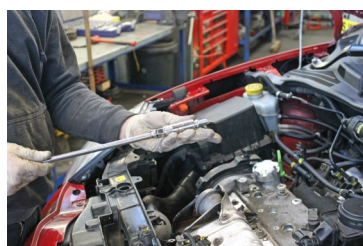


Once all coils are inserted by hand, re-fit the 10mm bolts and tighten securely.



## 3.5 Fit New Spark Plugs

Apply the new spark plugs by hand at first, placing them inside the 16mm spark plug socket and carefully tightening them into each recess by hand.



Do all four by hand taking care to ensure they each seat correctly into the thread.

Once all four new spark plugs are hand-tight, then each can be tightened again with the 16mm socket.



## 3.5 Re-Fit Ignition Coils

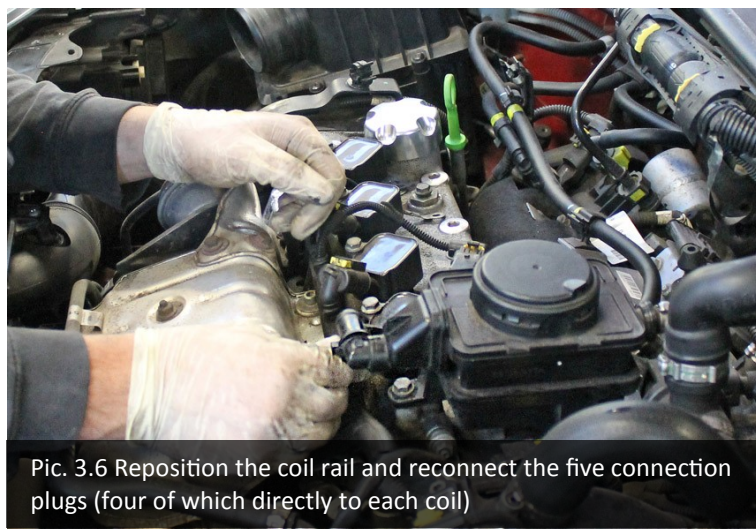
Each of the four ignition coils can now be re-fitted by hand into the spark plug recesses. They simply push down firmly and seat on the spark plugs (you will hear a 'pop' as they



Pic. 3.4 Spark plug recesses accessible with coils removed



Pic. 3.4 Remove all four spark plugs with 16mm plug socket



Pic. 3.6 Reposition the coil rail and reconnect the five connection plugs (four of which directly to each coil)



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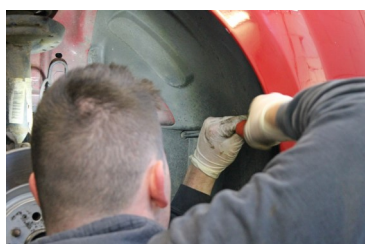


## 4. Change Cambelt

If you are not changing the cambelt and water pump, you can skip these sections. But if you are replacing the cambelt, you should take the opportunity to change the water pump too whilst it is accessible.

### 4.1 Remove front wheel and trim panel

Remove the front offside wheel, then remove the plastic side engine protection panel from within the wheel arch.



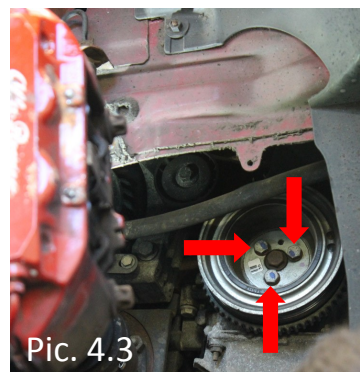
### 4.2 Remove Auxiliary Belt

With the plastic side panel removed from the wheel arch, you can see the auxiliary belt at the lower side of the engine.

Using a 13mm spanner on the auxiliary belt tensioner (arrowed in pic. 4.2 at the top of this page) push and hold down in a clockwise direction to release the tension on the auxiliary belt, then remove the belt.

### 4.3 Remove Bottom Aux Pulley

Remove the three 13mm bolts (arrowed in pic 4.3 below) on the bottom auxiliary pulley and remove it.



Pic. 4.3

### 4.4 Take the Weight of the Engine on a Jack/Axle Stand

To access the cambelt, it is necessary to remove the off-side engine mounts. For this reason, it is imperative that the weight

of the engine is taken with a jack or an axle stand, ideally with a solid block of wood between the jack/stand and the bottom of the engine. Check and double check the safety of the setup before proceeding.



### 4.5 Remove Engine Mounts

Firstly, remove the three 18mm bolts on the side engine mount (see pic. 4.5(a) on the right).

Then remove the three 15mm bolts on the engine mount (see pic. 4.5(b) on the right).

Finally, remove the five 13mm bolts on the engine mount bracket (see pic. 4.5(c) on the right).

With the engine mounts removed, the weight of the engine is now on the axle stand or jack.

### 4.6 Remove Cam Covers

Once the engine mounts are removed you can see the upper and lower plastic cam covers.



Pic. 4.2 Holding the auxiliary belt tensioner with a 13mm spanner, push and hold down clockwise to release tension on the belt



Pic. 4.5(a) Remove three 18mm side engine mount bolts



Pic. 4.5(b) Remove three 15mm engine mount bolts



Pic. 4.5(c) Remove five 13mm engine mount bracket bolts

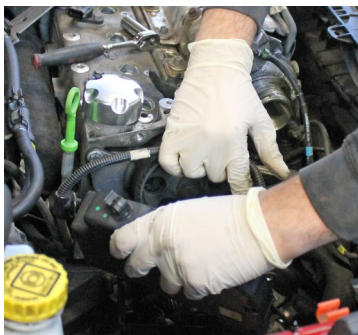


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Unbolt and remove the plastic cam covers, and gently ease



out the electrical hosing which is attached to the inside of the top cover.



You can now see the full cambelt and water pump (see pic. 4.6 at the top of this page).

## 4.7 Lock the Crank

Before replacing the cambelt, it is critical that neither the crankshaft (at the bottom of the engine) nor the camshaft (at the top of the engine) move during removal and installation. To facilitate this, a crank locking tool is attached to the crank.

The crank is slowly rotated to align the locating lugs of the locking tool. The locking tool is then bolted to the crank gear and the crank locking tool securing mount which is between the crank gear at the bottom and the water pump above (see pic. 4.7 on the right of this page).

## 4.8 Lock or Mark the Camshaft

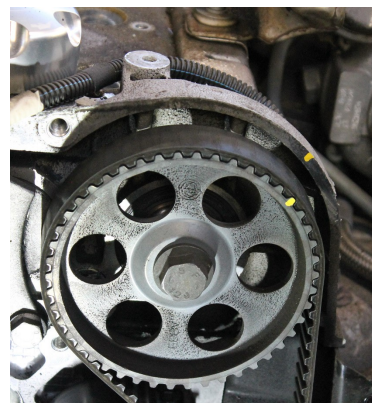
Once the crank (at the bottom) is securely locked using the locking tool, the camshaft (at the top) must also be locked or marked.

Camshaft locking tools can be used, but these require the top of the engine to be opened to apply the locking tools and the MiTo does not really need this as long as you or your technician

is experienced and careful.



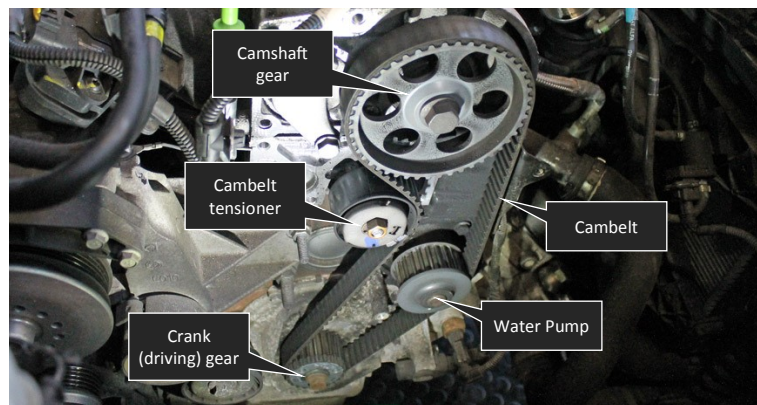
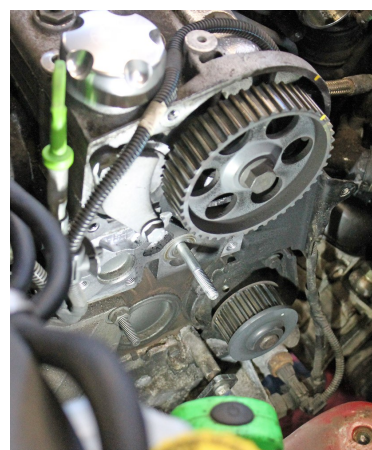
The key is to precisely mark the camshaft gear wheel and the engine casing in precise alignment, so you know the exact position of the wheel. These marks are then precisely aligned when you refit the new cambelt.



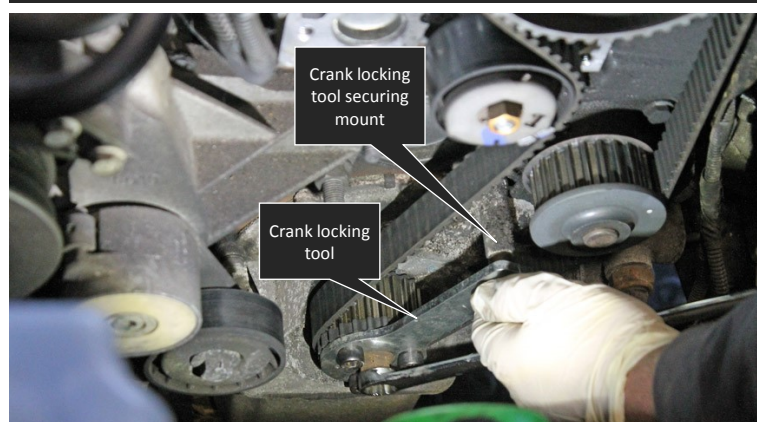
## 4.9 Remove Cambelt Tensioner and Cambelt

Use a 13mm socket or spanner to undo and remove the cambelt tensioner (arrowed in pic. 4.9(a) on the right).

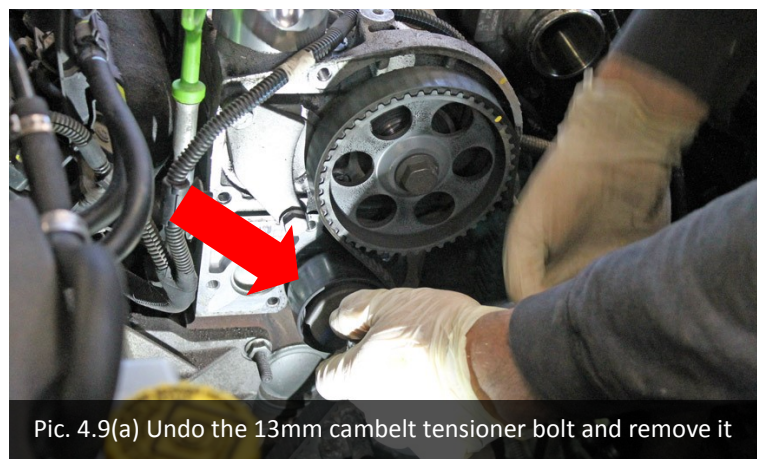
You can now completely remove the existing cambelt as shown in pic. 4.9(b) below right.



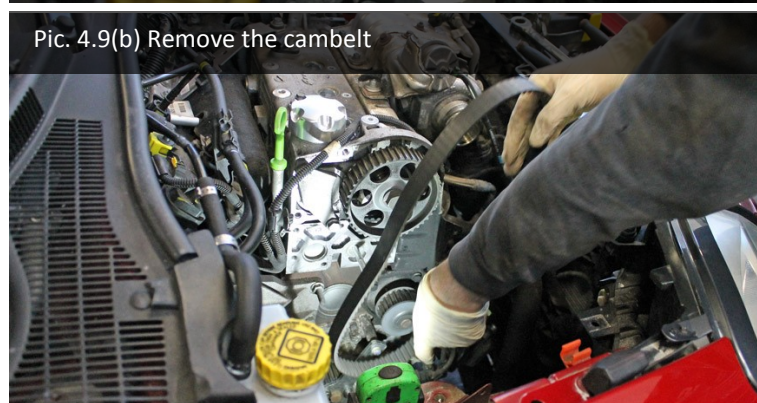
Pic. 4.6 Finally the cambelt, cambelt tensioner and water pump are visible with the plastic cambelt covers removed



Pic. 4.7 The crank is slowly rotated to align the locating lug of the locking tool which is then bolted in place to hold the crank firm



Pic. 4.9(a) Undo the 13mm cambelt tensioner bolt and remove it



Pic. 4.9(b) Remove the cambelt



## 5. Change Water Pump

Before you remove the water pump, place a receptacle (or bucket) below the engine, underneath the cambelt/water pump side. It's about to get very wet...



### 5.1 Remove Water Pump

Undo the three water pump securing bolts (see pic. 5.1(a) at the top of this page) then gently prise the water pump away from the engine casing (arrowed in pic. 5.1(b) on the right of this page). Once the pump feels a little loose and (probably) some coolant starts to leak, hold the water pump firmly and remove it by hand. (coolant will pour out for some time).



### 5.2 Clean Water Pump Seal

To ensure the new water pump can seal cleanly with the engine casing, it is important to

thoroughly clean the sealing area of the engine casing. This is done initially with a very fine wire wool (either by hand or on a drill/air attachment), then by hand with a razor blade to ensure no previous sealant remains and the whole area is clean (see pic. 5.2 below right, and image below).



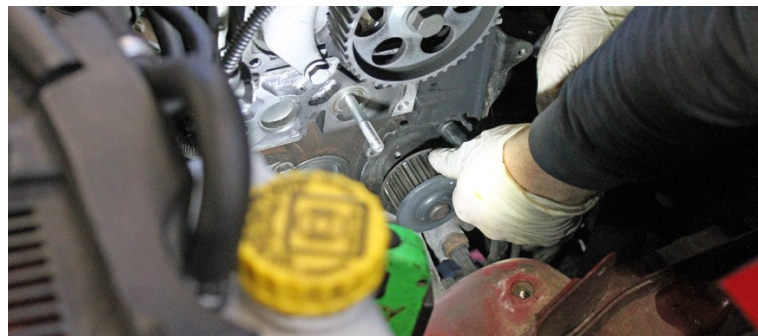
### 5.3 Apply Sealant to Water Pump and Fit

Apply fresh sealant to the new water pump (see pic 5.3 below right) then fit the new water pump (see below).



### 5.3 Refill Coolant

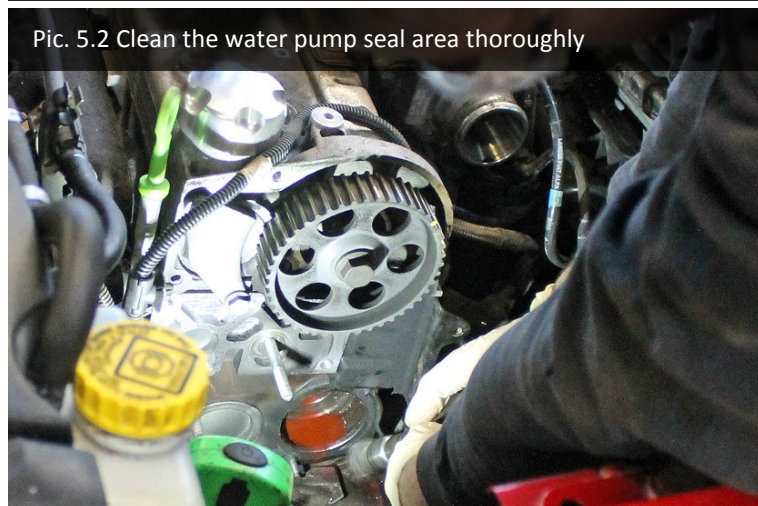
Fill up the coolant and wait for it to go down before filling up again to the correct level.



Pic. 5.1(a) Remove the water pump securing bolts



Pic. 5.1(b) Prise the water pump away from the engine casing



Pic. 5.2 Clean the water pump seal area thoroughly



Pic. 5.3 Apply fresh sealant to the water pump before fitting



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## 6. Fit New Cambelt

### 6.1 Fit and Align Cambelt and Cambelt Tensioner

Begin by fitting the new cambelt tensioner but do not fully tighten.



Now the new cambelt can be fed into place carefully, ensuring all the teeth are correctly seated in each gear wheel.



It is important to now rotate the cambelt tensioner slightly anti-clockwise to align the markings circled in pic. 6.1 at the top of this page. This creates the correct tension. Finally check the tensioner and fully tighten it.

### 6.2 Check and Double-Check Camshaft Alignment

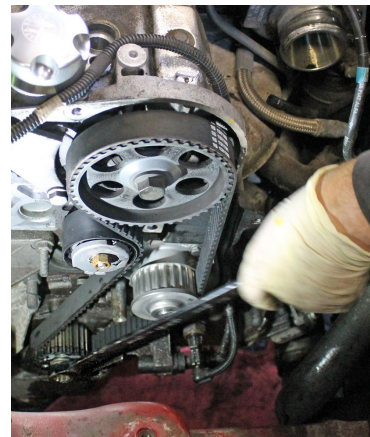
Ensure the markings on the camshaft gear and the engine casing are still in perfect alignment.



### 6.3 Remove Crankshaft Locking Tool and Rotate Engine

Unbolt and remove the crankshaft locking tool (see pic 6.3 on the right).

Now rotate the crank using a ratchet or socket and ensure the engine turns at least two full cycles with no issues. The camshaft markings should still re-align as you turn full cycles.



### 6.4 Re-Fit Cambelt Covers

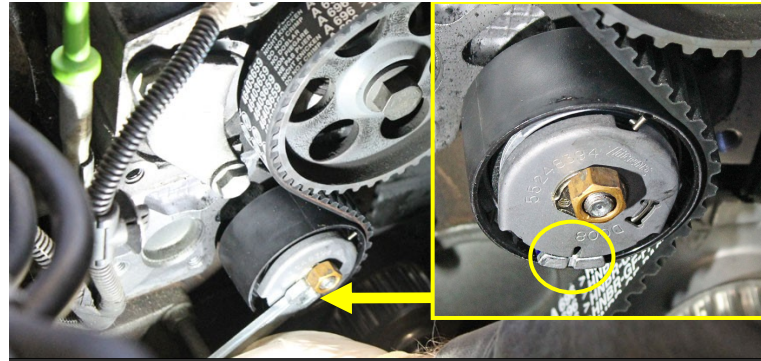
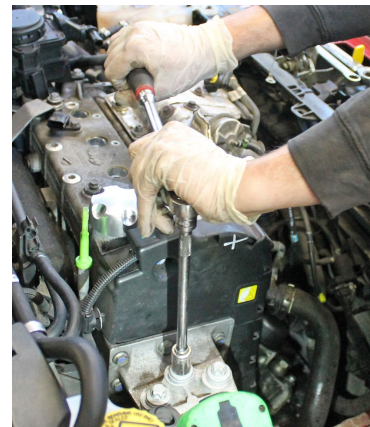
Carefully feed the wires into the top of the plastic cambelt cover and re-fit the cambelt covers (see pic. 6.4 on the right).

### 6.5 Re-Fit Side Engine Mount Bracket

Copper grease should be applied to the threads of the side engine mount bracket, then the bracket is bolted back onto the side of the engine (see pic. 6.5 below/right) with five 13mm bolts..

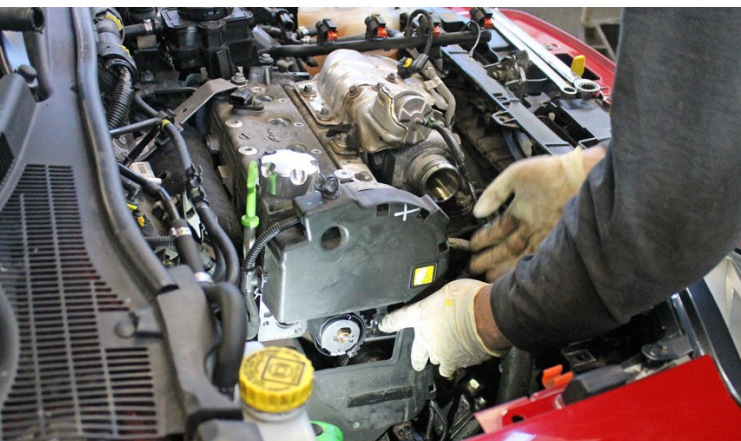
### 6.6 Re-Fit Side Engine Mount Bracket

Copper grease should be applied to the threads of the engine

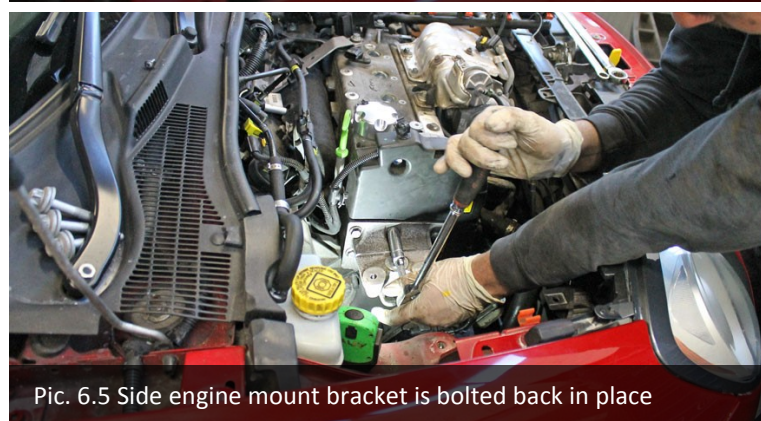


Pic. 6.1 Cambelt tensioner alignment

Pic. 6.3 Unbolt the crankshaft locking tool



Pic. 6.4 Re-fit the plastic cambelt covers (feeding wiring through)



Pic. 6.5 Side engine mount bracket is bolted back in place



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mounts, then the engine mounts should be bolted on, firstly the three 18mm bolts on the side engine mount then the three 15mm bolts on the engine mount.



## 6.7 Re-Fit Auxiliary Pulley and Belt

Re-fit the lower auxiliary pulley wheel with the 13mm bolts.



To fit the new auxiliary belt, use a 13mm spanner on the end of the auxiliary belt tensioner (circled in pic. 6.7 at the top of this page) and push and hold down clockwise to release the tension, enabling you to feed the new auxiliary belt into place before releasing the spanner on the tensioner.

Check the auxiliary belt is tight, fed correctly and all the teeth are seated correctly.

## 6.8 Re-Fit Side Engine Splash Guard and Front Wheel

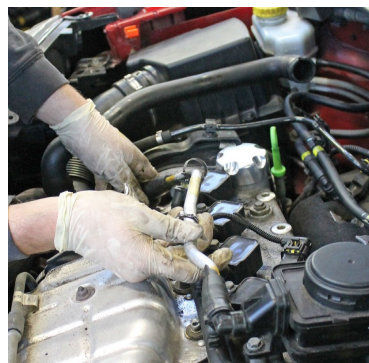
Re-fit plastic side engine guard liner in the front wheel arch with a cross-head screwdriver, then re-fit the off-side front wheel.

You can now remove the axle stand/jack which is holding the weight of the engine as the engine mounts are now back in place.

## 6.9 Re-Fit Air Intake Pipework, Breather Rail and Air Box

Re-fit all the air intake pipes and hoses, re-fitting the CLIC-R or jubilee clips correctly. Ensure the small hose at the bottom of the air intake pipe (just to the left of the turbo connection) has a new cable tie fitted (see pic 6.9 on the right).

Re-fit the breather rail (pic. below) and tighten the clips then finally re-fit the air-box.



Check and double-check all hoses and connections are tight and fitted correctly. Refer to your pictures you took at the beginning.

## 6.10 Re-Fit Engine Cover

Re-fit the engine cover and tighten the top hoses (12/155TB only) as per pic. 6.10 right).

## 6.11 Run Engine and Check

Check the coolant and oil levels and top-up if needed. Start the engine and check there is no fluid leaks and the engine is running fine.

## 6.12 Re-Fit Undertray

Re-fit the undertray and lower the car.

## 6.13 Test Drive and Check Fluids

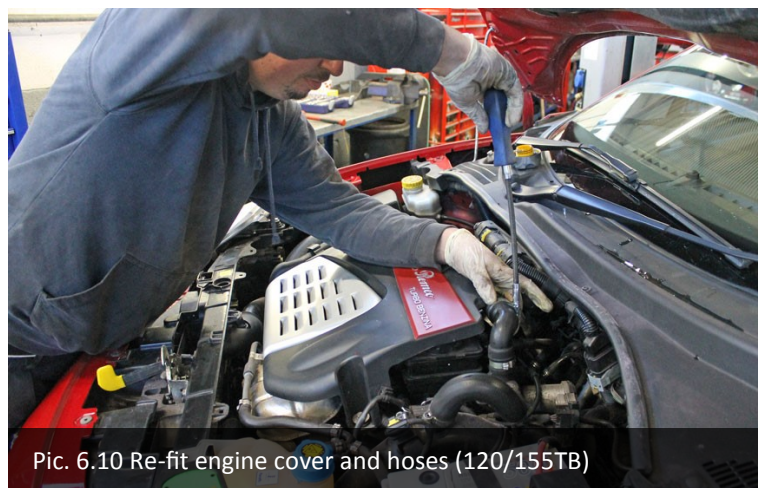
Test drive the car to get it to operating temperature, then do a final oil and coolant level check and top-up as necessary.

Your MiTo is fully serviced.



Pic. 6.7 Fit new auxiliary belt by slackening off the tensioner

Pic. 6.9 Refit air pipework and hoses, ensuring the lower hose shown below is held with a new cable tie



Pic. 6.10 Re-fit engine cover and hoses (120/155TB)



Pic. 6.13 Test drive to reach operating temperature then check oil and coolant levels again and top-up if necessary