

### **Ignition timing for the 1FZ-FE 4500cc petrol motor**

This modification deviates from the manufacturer's specifications. This is not endorsed by Toyota. You are liable for anything and everything to do with your 80 Series if you modify it.

The twin cam 4500cc 80 Series motor has quite a conservative factory ignition timing spec. Probably due to the fact that they are prone to pinging without the "mechanically barren" driver knowing it. They are built with a knock sensor which retards the ignition timing when it logs a number of knocks in quick succession. The engine ECU does not keep a log of knocking (as opposed to almost anything else to do with the vehicle).

The ECU adjusts the ignition advance relative to the base timing given a number of inputs from other sensors feeding it information. It however has no concept of total advance. This means that with additional advance, the ignition timing retains the additional advance right through the rev range.

You do have the ability to gain some power, especially off the mark and at lower revs as well as better fuel economy by advancing the ignition

timing. The quality of fuel however plays an important role in how successful this mod is.

All you will need is a paper clip, an ignition timing light and a 12mm spanner.

Firstly, make sure the engine's at normal operating temperature and that the A/C is off. Connect the timing light to plug lead No 1 and check the ignition timing. It's probably around 10 deg BTDC under normal ECU control.

Switch the engine off, remove the key and locate the ECU service plug. Using the bent paper clip, short out the E1 and TE1 terminals. Confirm that the contact is made by turning the ignition on and on most models, the engine check dash lamp will blink.

Start the engine and check ignition timing (now in service mode). The standard timing is 3deg BTDC and is marked on the timing chain cover.

If the timing is unchanged from when you previously checked (around 10 deg) it means that the terminals E1 and TE1 have not be shorted.

Loosen the distributor bolt and advance the timing to 6 or 7 deg (Australian spec. Maybe the same for other countries). Tighten the distributor bolt and check the timing again.

Turn the engine off, remove the key and remove the paper clip. Check the ignition timing again (now under ECU control) and it should read anywhere between 0deg - 16deg BTDC.

Road test paying particular attention to any knocking sounds from the motor with the accelerator floored at ~2,000 rpm. If it does knock, then retard the timing. Knocking or pinging is often affected by the quality of petrol (gas), altitude and/or carbon deposits in the combustion chamber. If it doesn't ping, you can experiment with more advance, however anything over 10 deg BTDC is considered to be a lot for this motor.

If the ignition is over advanced and the knock sensor signals that the timing is to be retarded, then you will actually lose on performance (and economy) since it retards in large steps.

Each engine is different as are fuels from different suppliers. Fuels also vary in quality throughout the year.

When well adjusted, you'll notice the extra power.

